THE CHESAPEAKE BAY INSTITUTE
of The Johns Hopkins University

TECHNICAL REPORT VI

THE REDUCTION AND ANALYSIS DATA FROM THE JAMES RIVER OPERATION OYSTER SPAT

by

D.W. Pritchard and Richard E. Kent

Reference 53-12
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Director

I. INTRODUCTION

The physical and chemical data collected during the summer of 1950 in the James River oyster seed bed area are tabulated in Chesapeake Bay Institute Data Report No. 7. Some of the conclusions obtained from the analysis of the data have been presented in Chesapeake Bay Institute Technical Reports III and IV (Pritchard 1952).

The purpose of this report is to present in some detail the techniques practiced in the reduction and analysis of the data. All reduced data including those used in the text may be found in the appendix.

Whereas Technical Reports III and IV employed the English Measure-System this report will present its calculations using the Metric System. In addition, some terms in the salt balance which had been neglected previously have been included here.

II. THE SALT BALANCE EQUATION

Consider a left-handed coordinate system with its x_1 axis directed horizontally downstream, with its x_2 axis directed vertically downward, and with its x_3 axis directed laterally across stream.

The salt balance equation as presented in Technical Report III is

$$(1)\quad \frac{\partial \bar{s}}{\partial t} = -\bar{v}_1\frac{\partial \bar{s}}{\partial x_1} - \bar{v}_2\frac{\partial \bar{s}}{\partial x_2} - \frac{\partial \langle v_1' s' \rangle}{\partial x_1} - \frac{\partial \langle v_2' s' \rangle}{\partial x_2} - \frac{1}{w}\langle v_2' s' \rangle \frac{\partial w}{\partial x_2}$$

where $\underline{w}$ is the width of the estuary and is considered to be a function of x_2 only.

For mean steady state (1) becomes

$$(2)\quad \bar{v}_1\frac{\partial \bar{s}}{\partial x_1} + \bar{v}_2\frac{\partial \bar{s}}{\partial x_2} + \frac{\partial \langle v_1' s' \rangle}{\partial x_1} + \frac{\partial \langle v_2' s' \rangle}{\partial x_2} + \frac{1}{w}\frac{\partial w \langle v_2' s' \rangle}{\partial x_2} = 0 .$$

The values and relative importance of the several terms in equation (2) may be seen in Table I of Technical Report III for a typical James River station.

The equation to be used in this paper differs from equation (2) by the inclusion of two additional terms, the first representing the local time change of mean salinity, $\frac{\partial \bar{S}}{\partial t}$, and the second the longitudinal width-change effect, $\frac{\partial w}{\partial x_1}$. The inclusion of these terms does not alter appreciably the previous conclusions but makes for completeness of solution.

Including these terms the salt balance equation is

$$(3) \quad \frac{\partial \bar{S}}{\partial t} = -\left(\bar{v}_1 \frac{\partial \bar{S}}{\partial x_1} + \bar{v}_2 \frac{\partial \bar{S}}{\partial x_2} + \frac{1}{w} \frac{\partial w \langle v_1' S' \rangle}{\partial x_1} + \frac{1}{w} \frac{\partial w \langle v_2' S' \rangle}{\partial x_2} \right) .$$

The following pages will present the procedures followed in the evaluation of the terms in (3).

The symbol $\bar{S}$ designates the mean concentration of salt and has units of grams per cubic meter. Hereafter the term "salinity" will be used to designate this volume-concentration, though strictly speaking this is not a correct designation since "salinity" normally refers to a concentration measure in grams per kilogram.

Data for three stations for three time periods were analysed. The Stations J-11, J-17, and J-24 and their respective positions are shown in Figure 1. The time periods were 18-23 June, 26 June - 7 July, and 17-21 July of 1950.

III. REDUCTION OF RAW DATA

A. Current Velocity Data

Current velocity observations were obtained by the confined drag method (Pritchard and Burt 1951).

Individual current velocity observations for each station when plotted on a polar diagram indicated that the currents were oscillatory in character, changing direction from ebb to flood, and *vice versa*, through 180° quite abruptly. The choice of the particular range of directions which were designated as "flood" directions or "ebb" directions was made on the basis of an examination of a polar-diagram-overlay upon the plotted position of the particular station on the chart. The few observations with directions outside of the relatively narrow bands designated, (i.e., having more or less a cross-channel direction) were included in the slack water observations as being indicative of the period of change of current direction from ebb to flood or *vice versa*.

Designating the ebb velocities and flood velocities as positive and negative, respectively, a time plot of the horizontal current v_1 was made at each station for each period. The mean flood, mean ebb, and net non-tidal current $\bar{v}_1$ were then determined by planimetering the areas above and below the zero velocity line.

Only at Station J-17 were observations taken at sufficiently close time intervals to permit use of the direct procedure outlined above. For each of the other stations the curve from J-17 was fitted to the individual velocity measurements by obtaining a phase lag and flood and ebb velocity factors. In addition the duration of the flood and ebb currents at each station was compared with that at J-17. This permitted velocity-time curves for Stations J-11 and J-24 to be constructed with more confidence than could have been obtained from use of the limited data at each station independently of the excellent time series at J-17.

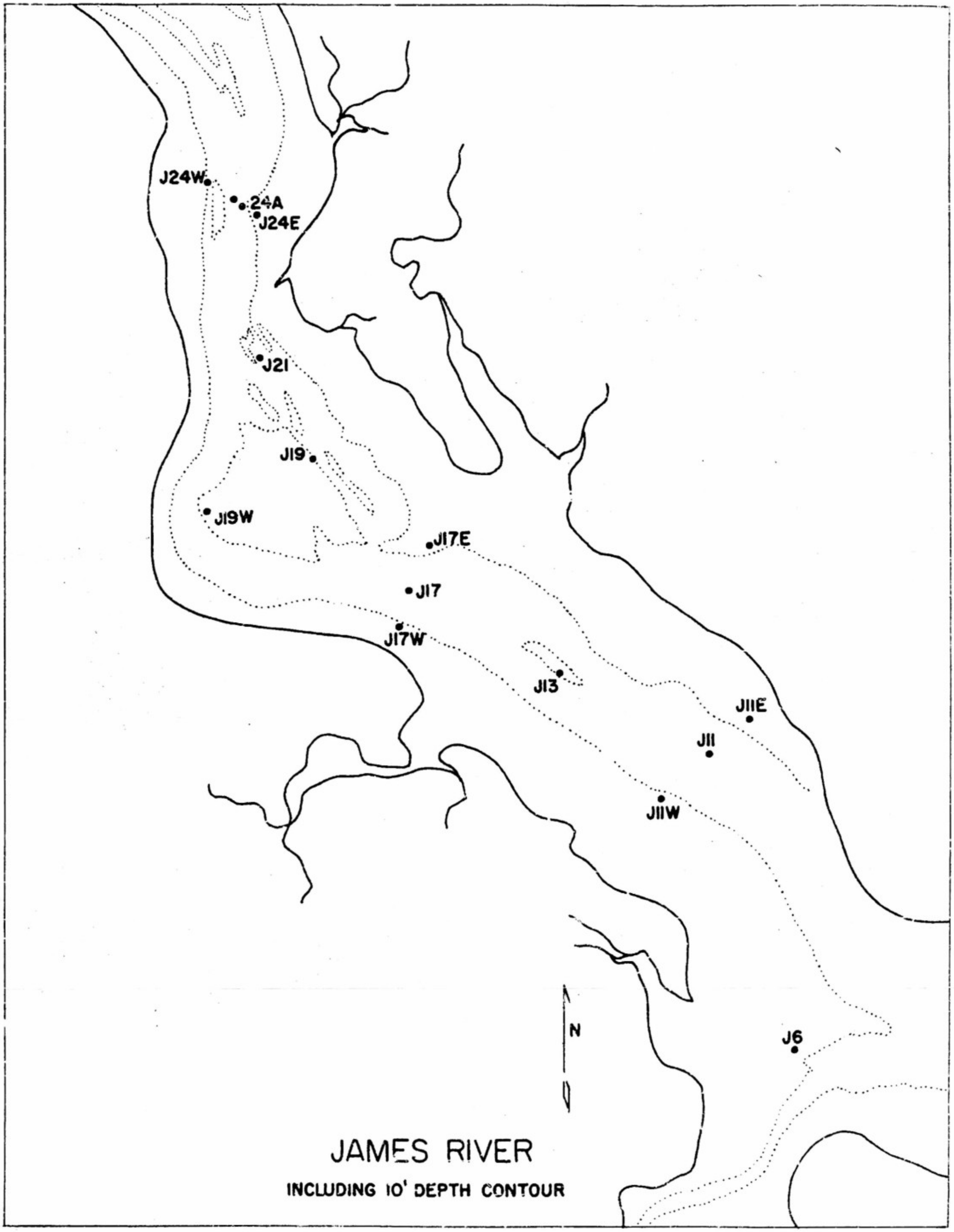

J24W
24A
J24E
J21
J19
J19W
J17E
J17
J17W
J13
J11E
J11
J11W
J6
N
JAMES RIVER
INCLUDING 10' DEPTH CONTOUR

FIGURE 1

The vertical variations of the mean ebb, mean flood, and the net non-tidal velocities at Station J-17 for each time period are shown in Figures 2 and 3.

B. Salinity Data

The first half of the salinity data was obtained through chlorinity titrations of serial samples. The second half of the salinity data was obtained using an *in situ* temperature and conductivity indicator.

The principal task in the reduction of the salinity data was to obtain a characteristic mean salinity *versus* depth curve for each period of measurement.

The typical vertical variation in salinity showed at middepth a region of relatively rapid change separating an upper layer of low salinity and slight gradient from a lower layer of high salinity and slight gradient. The depth of this halocline varied somewhat with time, and, consequently, a simple average of the salinity data by depth tended to smooth the actual curve, yielding a mean curve showing a more nearly linear increase in salinity with depth than was characteristic of any of the individual curves. Since the essential feature to be maintained was the average vertical gradient, the following procedure was employed for each period.

Individual salinity *versus* depth curves were plotted for serial observation. The depth of maximum vertical salinity gradient was selected visually for each curve and the salinity values were read off of each curve at one foot intervals above and below this inflection point. Then the average depth and salinity of the inflection point together with the average of the salinities at the one foot intervals were obtained. The mean curve for each station and for each time period with the characteristic shape of the salinity-depth curve was the result of this procedure.

The mean salinity-depth curves at Station J-17 for three periods are illustrated in Figure 4.

IV. RESOLUTION AND EVALUATION OF THE TERMS IN THE SALT BALANCE EQUATION

A. The Local Time Change of Mean Salinity $\frac{\partial \bar{S}}{\partial t}$

Values of the mean salinity for each time period were plotted against time, and values of the gradient $\frac{\partial \bar{S}}{\partial t}$ were determined graphically at half-meter intervals of depth. Values of $\bar{S}$ and $\frac{\partial \bar{S}}{\partial t}$ for all periods at Station J-17 are presented in Table I.

Table I

Depth (m)	18-23 June		26 June-7 July		17-21 July	
	$\bar{S}$ $(gm^{-3})\times10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times10^{3}$	$\bar{S}$ $(gm^{-3})\times10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times10^{3}$	$\bar{S}$ $(gm^{-3})\times10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times10^{3}$
0.0	10.86	-0.42	11.47	-0.18	10.72	-0.02
0.5	11.00	-0.36	11.67	-0.12	10.96	-0.05
1.0	11.06	-0.13	11.74	-0.11	11.04	-0.16
1.5	11.08	0.0	11.75	0.0	11.06	-0.19
2.0	11.12	-0.01	11.81	0.0	11.10	-0.11
2.5	11.16	0.01	12.04	0.1	11.25	-0.12
3.0	11.42	0.08	12.35	0.4	11.47	-0.19
3.5	12.52	0.25	12.74	0.4	12.49	-0.35
4.0	13.20	0.48	13.34	0.4	13.13	-0.49
4.5	13.52	1.55	13.62	0.53	13.46	-1.13
5.0	13.67	1.45	13.69	0.49	13.59	-1.09
5.5	13.76	1.00	13.73	0.38	13.63	-0.96
6.0	13.90	1.05	13.88	0.37	13.72	-0.87
6.5	14.14	1.19	14.08	0.37	13.88	-0.89
7.0	14.42	1.20	14.27	0.37	14.10	-0.94
7.5	14.72	1.20	14.48	0.37	14.33	-0.95

B. The Longitudinal Terms

There are two longitudinal terms in equation (3). One is an advective term $\bar{U}_1 \frac{\partial \bar{S}}{\partial x_1}$ and the other is a non-advective term $\frac{1}{\omega}\frac{\partial \omega \langle U_1' S' \rangle}{\partial x_1}$.

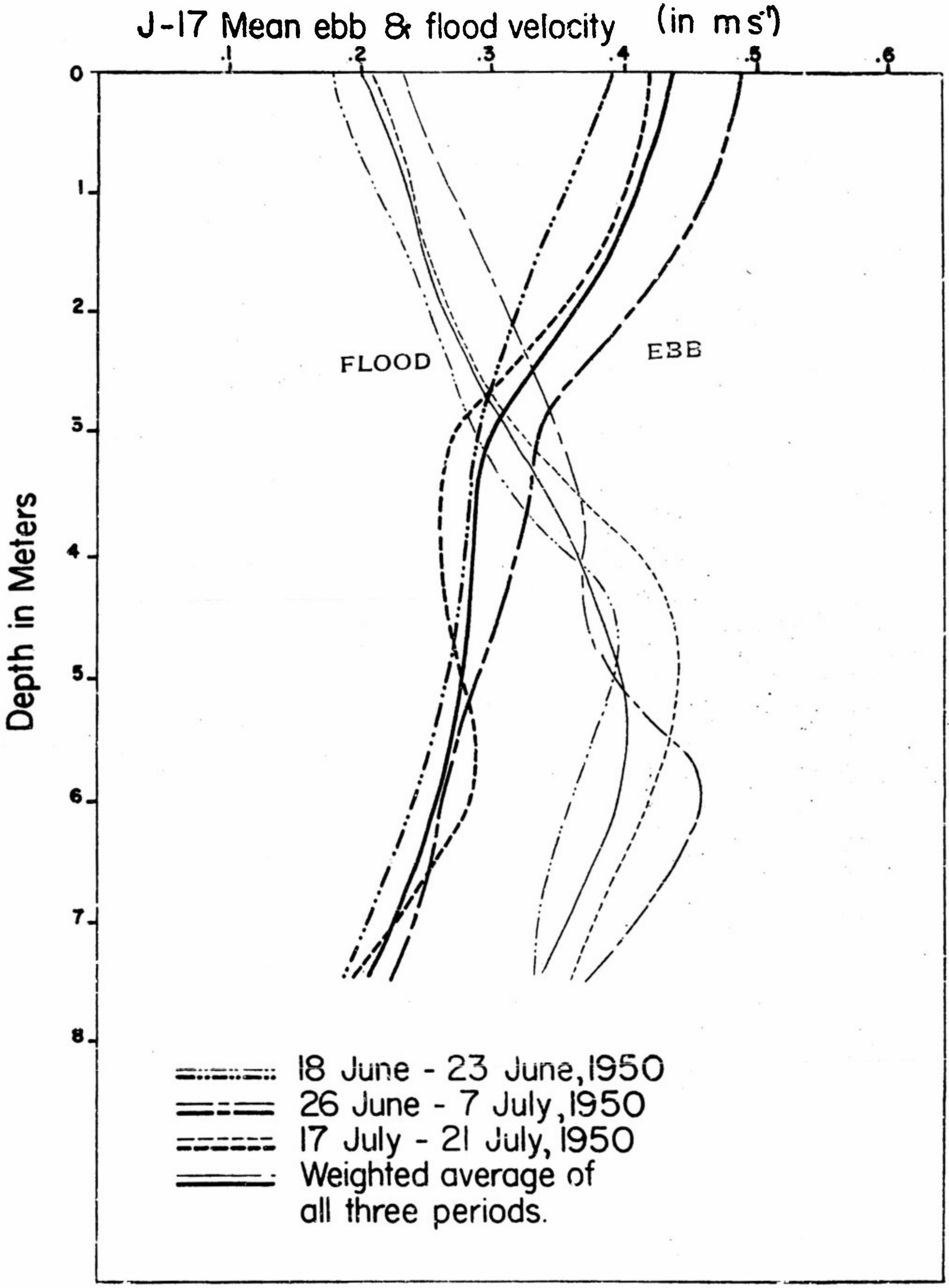

J-17 Mean ebb & flood velocity (in ms⁻¹)
.1
.2
.3
.4
.5
.6
0
1
2
3
4
5
6
7
8
Depth in Meters
FLOOD
EBB
18 June - 23 June, 1950
26 June - 7 July, 1950
17 July - 21 July, 1950
Weighted average of
all three periods.

FIGURE 2

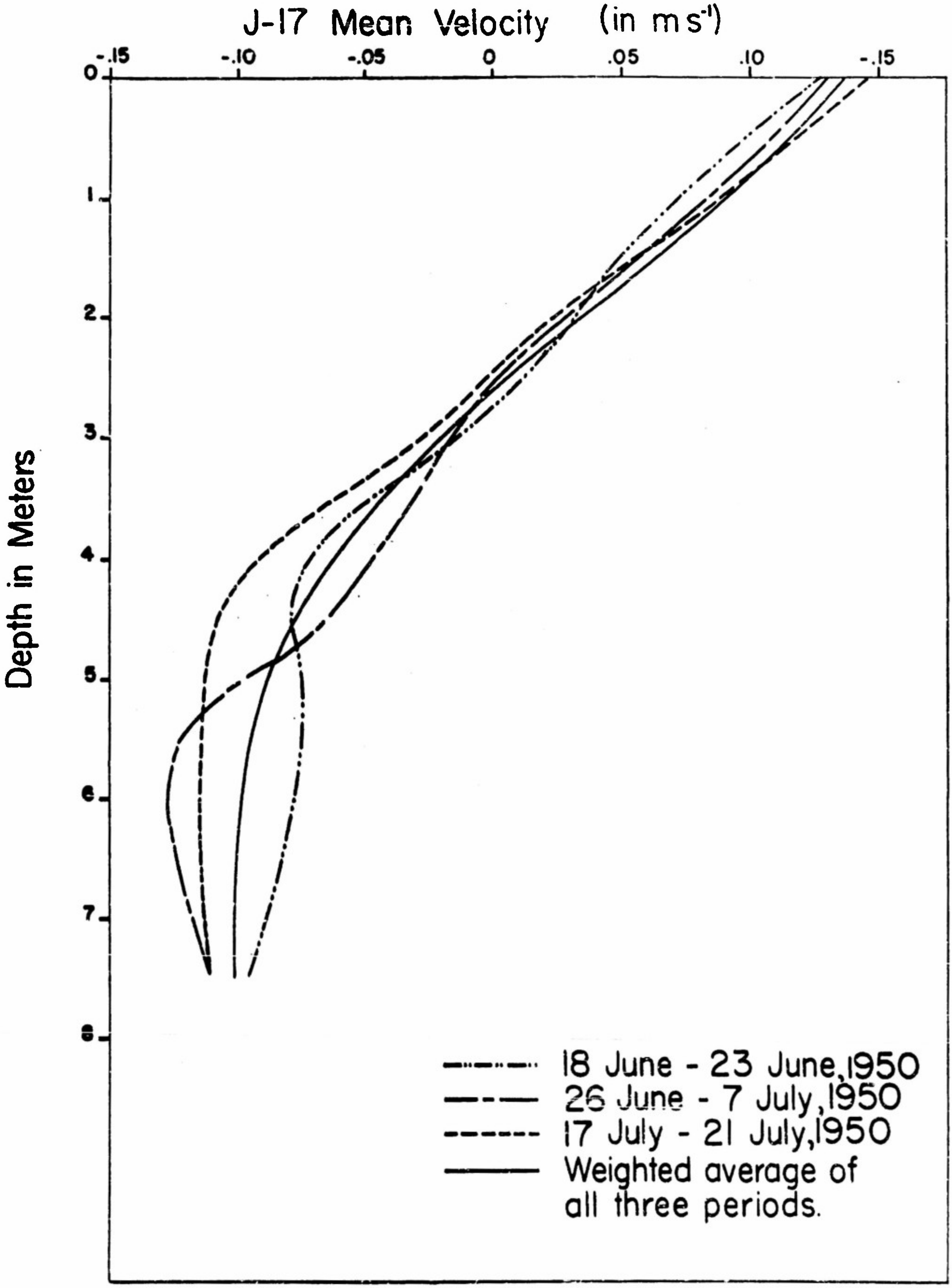
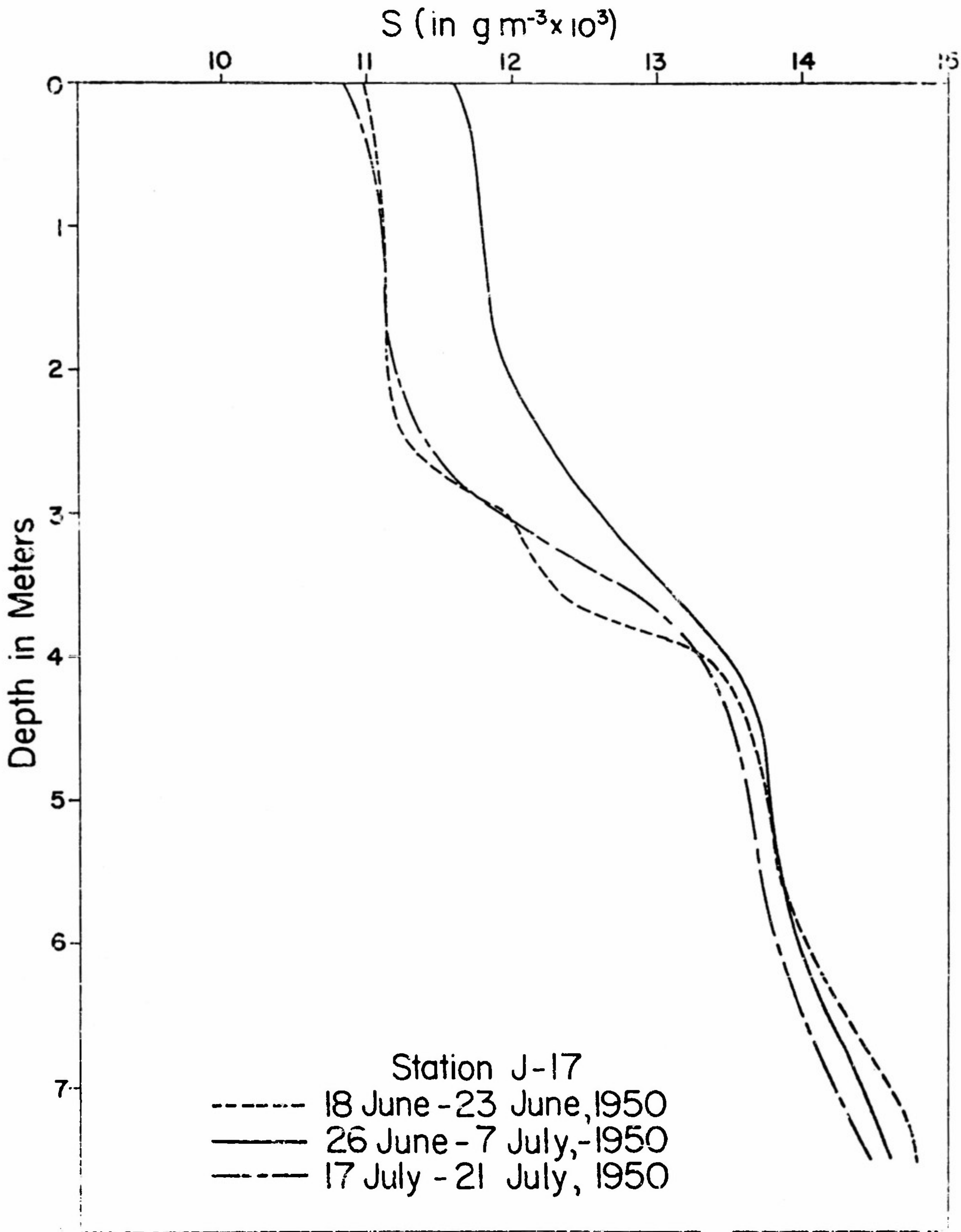

J-17 Mean Velocity (in m s⁻¹)
-.15
-.10
-.05
0
.05
.10
-.15
0
1
2
3
4
5
6
7
8
Depth in Meters
18 June - 23 June, 1950
26 June - 7 July, 1950
17 July - 21 July, 1950
Weighted average of all three periods.

FIGURE 3


S (in g m-3 x 10³)
10
11
12
13
14
15
0
1
2
3
4
5
6
7
Depth in Meters
Station J-17
18 June - 23 June, 1950
26 June - 7 July, -1950
17 July - 21 July, 1950

1. Advective term $\bar{v}_1 \frac{\partial \bar{s}}{\partial x_1}$

This term consists of two components, the mean horizontal velcoity $\bar{v}_1$, and the mean longitudinal salinity gradient $\frac{\partial \bar{s}}{\partial x_1}$. The method used in procuring $\bar{v}_1$ has been discussed in part III A of this paper. Values of $\frac{\partial \bar{s}}{\partial x_1}$ were obtained by plotting the observed mean salinity at half-meter intervals of depth against horizontal distance and determining the requisitve gradients graphically.

Values of $\bar{v}_1$, $\frac{\partial \bar{s}}{\partial x_1}$, and their product $\bar{v}_1 \frac{\partial \bar{s}}{\partial x_1}$ are given for Station J-17 in Table II. Negative values of $\bar{v}_1 \frac{\partial \bar{s}}{\partial x_1}$ represent a downstream flux of salt.

Table II

Values of $\bar{v}_1$, $\frac{\partial \bar{s}}{\partial x_1}$, and $\bar{v}_1 \frac{\partial \bar{s}}{\partial x_1}$ at J-17 (18-23 June)

Depth (m)	$\bar{v}_1$ ($m s^{-1}$)	$\partial \bar{s}/\partial x_1$ ($g m^{-4}$) x10	$\bar{v}_1 \, \partial \bar{s}/\partial x_1$ ($g m^{-3} s^{-1}$) x10
0.0	0.126	3.84	0.484
1.0	0.085	3.84	0.326
2.0	0.041	3.87	0.159
3.0	-0.002	4.20	-0.008
4.0	-0.053	4.13	-0.219
5.0	-0.072	4.00	-0.288
6.0	-0.070	3.97	-0.278
7.0	-0.080	3.97	-0.318

2. The Non-Advective Term $\frac{1}{w} \frac{\partial w \langle v_1' s' \rangle}{\partial x_1}$

It is seen that essentially the longitudinal non-advective term is composed of two variables, the width w and the deviation product $\langle v_1' s' \rangle$.

Observations of velocity and salinity for this study were obtained at stations located in the main channel and at the edge of the main channel. The water over the shallow flats inshore from the channel probably does not participate in the net flow to the same degree as the water over the deeper areas, but the extent of this departure was unknown. These inshore areas could most conveniently be treated by adjusting the width of the section at shallow depths so as to effectively eliminate that portion of the estuary which was not participating in the mean motion. This was done by adjusting the values of $\underline{w}$ above 1.5 meters* so that the observed river flow as obtained from the data supplied by the Maryland Geological Survey was equal to our calculated net river flow. For instance, at Station J-17 for the period 18-23 June 1950 the Survey data give a value for river flow of 0.124×10^3 cubic meters per second; corresponding to this in Table III $\underline{w}$ has been adjusted to give a value for $\sum_{x_2}^{0} \bar{U}_1 w \Delta x_2$ of 0.124×10^3 cubic meters per second. Figure 5 is a typical plot of the adjusted river widths *versus* depth as compared with the actual widths taken from the James River chart.

In Technical Report III it was stated that the deviation product $\langle U_1' S' \rangle$ could be determined by use of the expression

$$\iint_\sigma \bar{U}_1 \bar{S}\, d\sigma_1 + \iint_\sigma \langle U_1' S' \rangle d\sigma_1 = \frac{\partial \bar{S}}{\partial t} = 0 \quad . \tag{4}$$

Neglecting the lateral variation in the variables for purposes of numerical integration, it is practicable to designate $d\sigma_1$ as $w \Delta x_2$, whence equation

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* For Stations J-11 and J-17 the adjusted depths were 1.5 meters. For Station J-24 the corresponding depth was 1.0 meter.

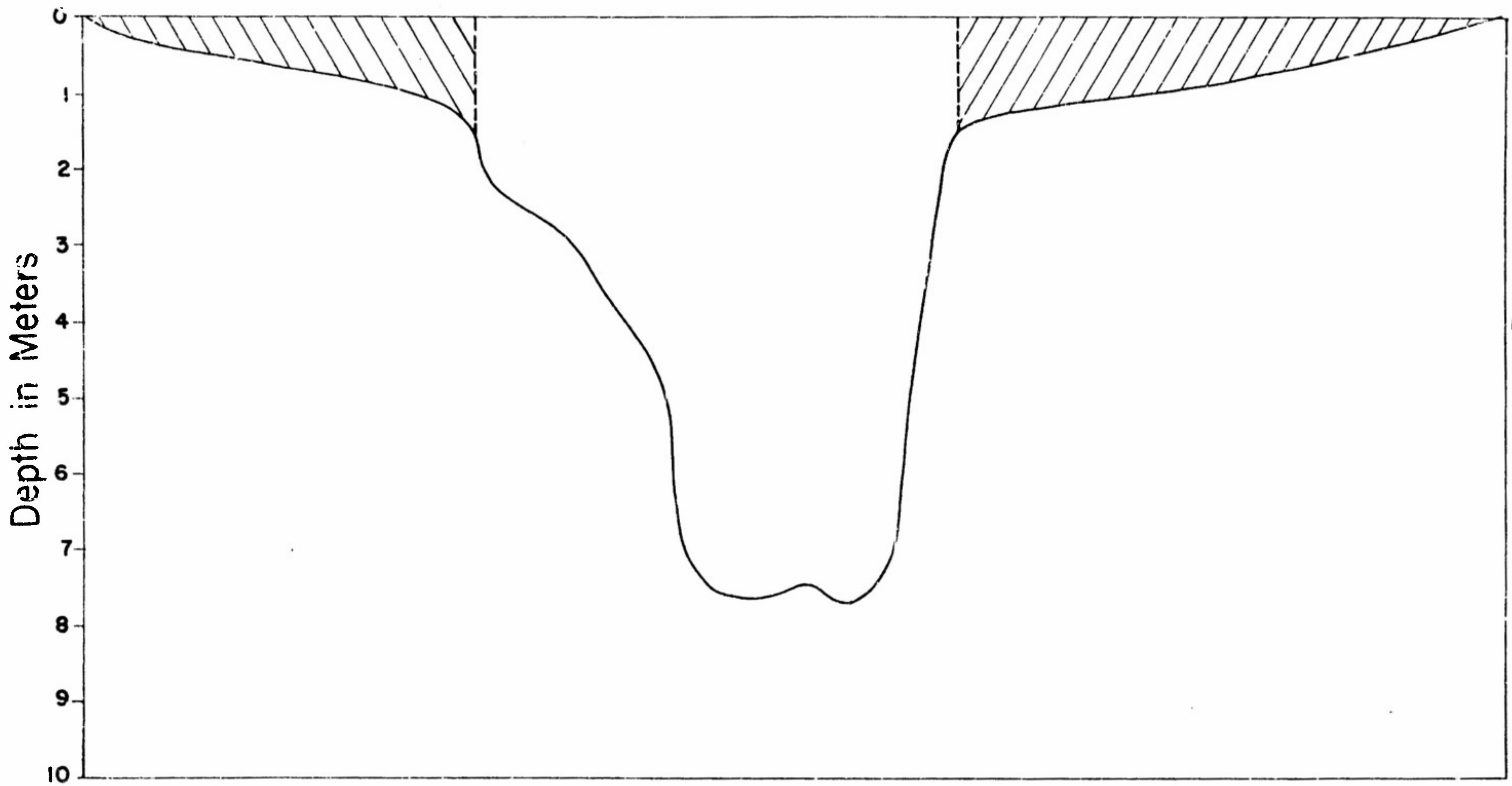


FIGURE 5 Comparison of actual cross-section with effective cross-section used in salt balance calculations. Cross-hatched portion is excluded from effective area.

(4) becomes

$$(5) \qquad -\sum_{x_2}^{0}(\bar{v}_1\bar{S}w)\Delta x_2 = \sum_{x_2}^{0}(\langle v_1's'\rangle w)\Delta x_2 \quad .$$

Assuming that the vertical variation in $\langle v_1' s'\rangle$ is negligible and solving equation (5) for the required deviation product we obtain

$$(6) \qquad \langle v_1's'\rangle = -\frac{1}{\sum_{x_2}^{0} w\Delta x_2}\left[\sum_{x_2}^{0}(\bar{v}_1\bar{S}w)\Delta x_2\right] \quad .$$

A negative value of $\langle v_1's'\rangle$ and hence $w\langle v_1's'\rangle$ indicates an upstream diffusion of salt and a positive value, a downstream diffusion of salt.

In order to obtain the longitudinal gradient of $\langle v_1's'\rangle$ plots of $w\langle v_1's'\rangle$ versus x_1 were made and values of $\frac{\partial w\langle v_1's'\rangle}{\partial x_1}$ then were read off of the graphs at the appropriate values of x_1. Subsequent division of this term by the value of the width at the prescribed depth then gave the desired horizontal non-advective term, $\frac{1}{w}\frac{\partial w\langle v_1's'\rangle}{\partial x_1}$ Table III gives in some detail the procedure followed in this series of calculations at Station J-17 for period 18-23 June, 1950. (See page 10.)

B. The Vertical Terms

There are two vertical terms in equation (4). One is an advective term $\bar{v}_2\frac{\partial\bar{S}}{\partial x_2}$ and the other is a non-advective term $\frac{1}{w}\frac{\partial w\langle v_2's'\rangle}{\partial x_2}$.

1. Advective Term $\bar{v}_2 \frac{\partial\bar{S}}{\partial x_2}$

This term involves two components, the mean vertical velocity $\bar{v}_2$, and the mean vertical salinity gradient $\frac{\partial\bar{S}}{\partial x_2}$.

The method used to obtain $\frac{\partial\bar{S}}{\partial x_2}$ from the raw data has been discussed in part II-B of this report.

Table III

Evaluation of $\frac{1}{\omega}\frac{\partial \omega \langle u_1' s' \rangle}{\partial x_1}$ at J-17 (18-23 June)

Depth (m)	$\bar{S}$ $(g\,m^{-3}) \times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	ω $(m) \times 10^{-3}$	$\bar{U}_1\omega$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{S}\bar{U}_1\omega$ $(g\,m^{-1} s^{-1}) \times 10^{-6}$	$\langle u_1' s' \rangle$ $(g\,m^{-2} s^{-1}) \times 10^{3}$	$\frac{\partial \omega \langle u_1' s' \rangle}{\partial x_1}$ $(g\,m^{-2} s^{-1}) \times 10$	$\frac{1}{\omega}\frac{\partial \omega \langle u_1' s' \rangle}{\partial x_1}$ $(g\,m^{-3} s^{-1}) \times 10^{4}$
0.0						-0.11	3.92	1.29
	10.93	0.116	3.03	0.351	3.84			
0.5						-0.11	3.92	1.29
	11.03	0.095	3.03	0.288	3.18			
1.0						-0.11	3.92	1.29
	11.07	0.074	3.03	0.224	2.48			
1.5						-0.11	1.86	0.61
	11.10	0.051	3.03	0.155	1.72			
2.0						-0.11	0.51	0.17
	11.13	0.032	3.01	0.096	1.07			
2.5						-0.11	-2.70	-1.00
	11.27	0.010	2.48	0.025	0.28			
3.0						-0.11	-1.78	-0.76
	11.96	-0.015	2.24	-0.034	-0.41			
3.5						-0.11	-1.38	-0.64
	12.28	-0.040	2.10	-0.084	-1.03			
4.0						-0.11	-1.17	-0.58
	13.36	-0.061	1.91	-0.117	-1.56			
4.5						-0.11	-1.12	-0.62
	13.60	-0.071	1.71	-0.121	-1.65			
5.0						-0.11	-0.71	-0.44
	13.72	-0.071	1.59	-0.113	-1.55			
5.5						-0.11	-1.07	-0.68
	13.83	-0.070	1.56	-0.109	-1.51			
6.0						-0.11	-1.79	-1.17
	14.02	-0.071	1.49	-0.106	-1.49			
6.5						-0.11	-0.87	-0.60
	14.28	-0.076	1.39	-0.106	-1.51			
7.0						-0.11	-1.38	-1.03
	14.57	-0.083	1.23	-0.102	-1.49			
7.5						-0.11	-0.10	-0.09

The mean vertical velocity $\bar{v}_2$ was obtained by taking its average value as found from two methods, each of which is based on continuity concepts and use of the mean horizontal velocities.

The first method utilized to obtain $\bar{v}_2$ is based on equation (9) of Technical Report III. It is

$$\iint_{\sigma} \bar{v}_i \, d\sigma_i = 0 \tag{7}$$

Let us consider a segment of an estuary extending from the surface to some depth x_2 and being bounded at each end by a known cross section where mean horizontal velocities are available. Since the volume of water flowing into this segment must be equal to that volume flowing out (neglecting changes in density within the segment), a knowledge of the parameters $\bar{v}_1$, w, and x_2 will combine to yield a value for the mean vertical velocity in this segment. In our case, since data were available from three stations, it is obvious that we have three segments, namely, 11-17, 17-24 and 11-24.

From equation (7) we have

$$\iint_{\sigma_1} \bar{v}_1 \, d\sigma_1 + \iint_{\sigma_2} \bar{v}_2 \, d\sigma_2 = 0 \quad \text{where } \bar{v}_3 = 0 \tag{8}$$

By taking the mean values of the parameters at the cross-sectional boundaries of each section and integrating numerically it is possible to solve for $\bar{v}_2$ and rewrite (8) as

$$\bar{v}_2 = \frac{\left(\sum_{x_2}^{0} \bar{v}_1 w \Delta x_2\right)_A - \left(\sum_{x_2}^{0} \bar{v}_1 w \Delta x_2\right)_B}{\bar{w} L} \tag{9}$$

where $$\bar{w} = \frac{w_A + w_B}{2} \quad \text{and} \quad L = (x_1)_A - (x_1)_B .$$

The procedure adopted for solution of (9) is presented in Table IV for segment 11-24.

Table IV

Evaluation of $\bar{v}_2$ from Equation (9) at J-17

Depth (m)	$\bar{\omega}$ (m) $\times 10^{-3}$	$[\sum \bar{U}_1 \omega \Delta x_2]_{24}$ $(m^3 s^{-1}) \times 10^{-3}$	$[\sum \bar{U}_1 \omega \Delta x_2]_{11}$ $(m^3 s^{-1}) \times 10^{-3}$	$[\Delta \sum \bar{U}_1 \omega \Delta x_2]_{11}^{24}$ $(m^3 s^{-1}) \times 10^{-3}$	$\bar{U}_2$ $(m s^{-1}) \times 10^{5}$
0.0	3.88	0.0	0.0	0.0	0.00
0.5	3.88	0.600	0.692	-0.092	-0.05
1.0	3.88	0.861	1.195	-0.334	-0.18
1.5	3.51	0.930	1.539	-0.609	-0.37
2.0	2.91	0.000	1.745	-0.845	-0.62
2.5	2.42	0.839	1.805	-0.966	-0.85
3.0	2.21	0.764	1.764	-1.000	-0.97
3.5	2.04	0.683	1.630	-0.947	-0.99
4.0	1.88	0.598	1.417	-0.819	-0.93
4.5	1.73	0.517	1.157	-0.640	-0.79
5.0	1.62	0.443	0.897	-0.454	-0.60
5.5	1.45	0.376	0.668	-0.292	-0.43
6.0	1.27	0.327	0.488	-0.161	-0.27
6.5	1.10	0.285	0.353	-0.068	-0.13
7.0	0.82	0.248	0.249	-0.001	-0.02
7.5	0.50	0.219	0.170	+0.049	+0.11

The value of $\bar{v}_2$ obtained is the mean for each segment and in this treatment is taken to be that value at the midpoint of the section. Since it was desirable that $\bar{v}_2$ be obtained at each station, a plot of $\bar{v}_2$ <u>versus</u> x_1 was made. These curves were then extrapolated to the desired station and the corresponding

value of $\bar{v}_2$ read off.

The second method utilized in obtaining the mean vertical velocity again follows from equation (7).

Since the segment is taken such that the lateral boundaries are the sides of the estuary, the lateral velocity does not enter into the equation. Neglecting the lateral variations in the component velocity $\bar{v}_1$, and taking the partial derivative with respect to x_1, equation (7) becomes

$$\frac{\partial}{\partial x_1}\int_{x_2}^{0}\bar{v}_1 w\, dx_2 + \frac{\partial}{\partial x_1}\int_{(x_1)_B}^{(x_1)_A}\bar{v}_2 w\, dx_1 = 0 \tag{10}$$

where $(x_1)_A$ and $(x_1)_B$ represent the position of the two cross sections.

Solving equation (10) for $\bar{v}_2$, we have

$$\bar{v}_2 = -\frac{1}{w}\sum_{x_2}^{0}\frac{\partial \bar{v}_1 w}{\partial x_1}\Delta x_2 \quad . \tag{11}$$

In order to evaluate (11) it is necessary to have $\frac{\partial \bar{v}_1 w}{\partial x_1}$. This was obtained by plotting the product $\bar{v}_1 w$ <u>versus</u> x_1 and reading the gradient graphically. The calculations obtained and the procedure followed are presented in Table V for Station J-17 for the period 18-23 June. (See page 14.)

The value of the mean vertical velocity used in the salt balance equation was the average value of $\bar{v}_2$ as obtained from the above two methods. These values are presented for Station J-17 in Table VI. Plots of the respective $\bar{v}_2$ components and their averages may be found in Figure 6.

Finally, in order to obtain the completed vertical advective term, the products of $\bar{v}_2$ and $\frac{\partial \bar{s}}{\partial x_2}$ were formed. The values of $\bar{v}_2\frac{\partial \bar{s}}{\partial x_2}$ for Station J-17 are given in Table VI. (See page 14.)

Table V

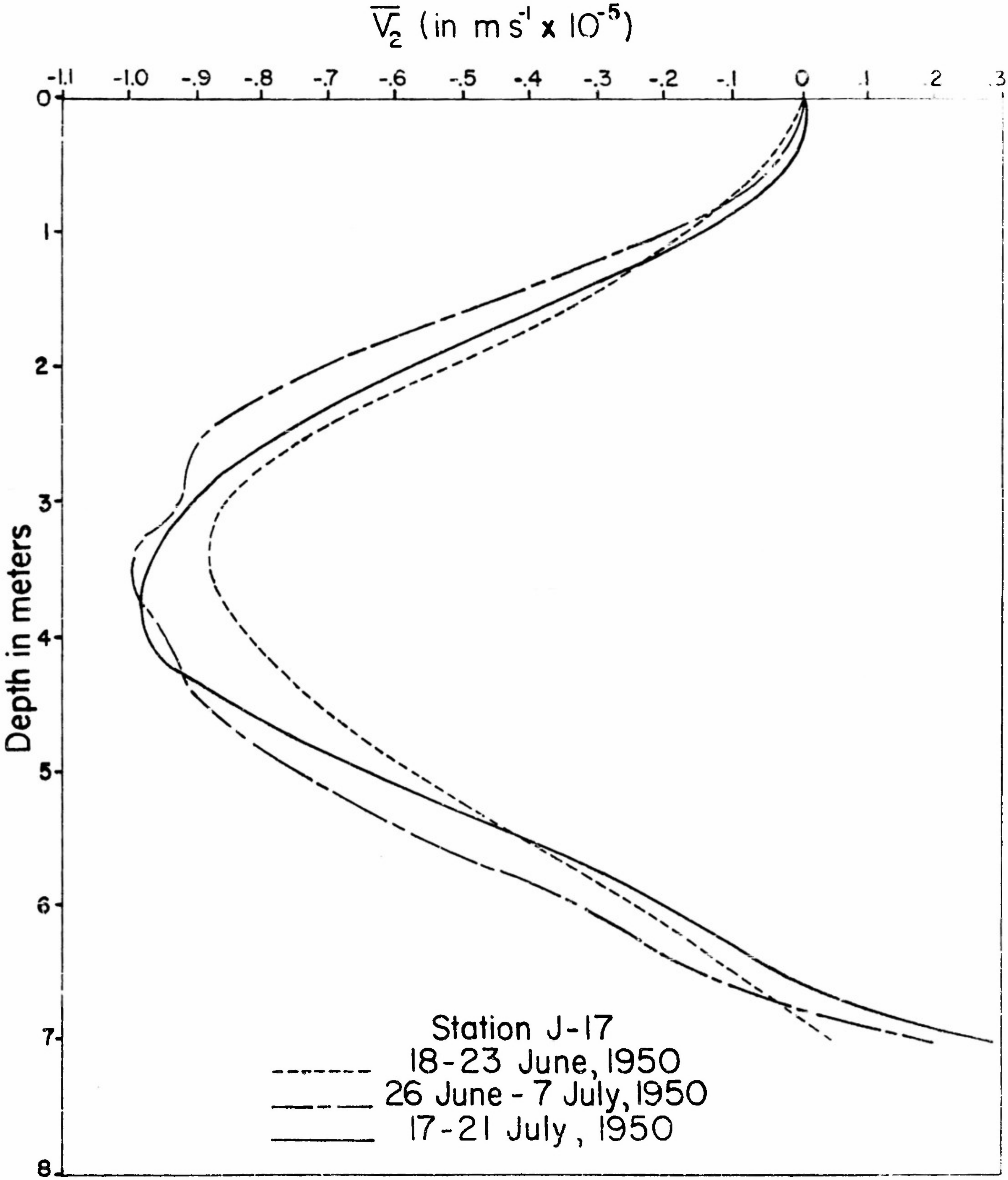
Evaluation of $\bar{v}_2$ from equation (11) at J-17 (18-23 June)

Depth (m)	$\partial \bar{u}_1 w / \partial x_1$ $(ms^{-1}) \times 10$	$\Sigma \frac{\partial \bar{u}_1 w}{\partial x_1} \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{v}_2$ $(ms^{-1}) \times 10^5$	Depth (m)	$\partial \bar{u}_1 w / \partial x_1$ $(ms^{-1}) \times 10$	$\Sigma \frac{\partial \bar{u}_1 w}{\partial x_1} \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{v}_2$ $(ms^{-1}) \times 10^5$
0.0		0.00	0.00	4.0		0.281	-0.69
	0.027				-0.044		
0.5		0.027	-0.04	4.5		0.238	-0.66
	0.071				-0.062		
1.0		0.098	-0.16	5.0		0.175	-0.54
	0.071				-0.093		
1.5		0.169	-0.28	5.5		0.083	-0.37
	0.086				-0.040		
2.0		0.255	-0.42	6.0		0.043	-0.21
	0.065				-0.041		
2.5		0.320	-0.60	6.5		0.002	-0.06
	0.036				-0.040		
3.0		0.356	-0.76	7.0		-0.037	0.14
	-0.035				-0.036		
3.5		0.321	-0.74	7.5		-0.043	0.20
	-0.039						

Table VI

Values of $\bar{v}_2$, $\frac{\partial \bar{s}}{\partial x_2}$ and $\bar{v}_2 \frac{\partial \bar{s}}{\partial x_2}$ at J-17 (18-23 June)

Depth (m)	$\bar{v}_2$ $(ms^{-1}) \times 10^5$	$\partial \bar{s} / \partial x_2$ $(gm^{-4}) \times 10^{-3}$	$\bar{v}_2 \, \partial \bar{s} / \partial x_2$ $(gm^{-3} s^{-1}) \times 10^2$
0.0	0.00	0.40	0.00
1.0	-0.17	0.08	-0.014
2.0	-0.52	0.08	-0.042
3.0	-0.86	1.36	-0.170
4.0	-0.81	1.00	-0.810
5.0	-0.57	0.24	-0.137
6.0	-0.24	0.28	-0.067
7.0	0.06	0.58	0.035



$\overline{V_2}$ (in m s^{-1} x 10^{-5})
-1.1
-1.0
-.9
-.8
-.7
-.6
-.5
-.4
-.3
-.2
-.1
0
.1
.2
.3
0
1
2
3
4
5
6
7
8
Depth in meters
Station J-17
18-23 June, 1950
26 June - 7 July, 1950
17-21 July, 1950

FIGURE 6

2. The Vertical Non-Advective Term $\frac{1}{w}\frac{\partial w\langle v_2' s'\rangle}{\partial x_2}$

The evaluation of the vertical non-advective term is a direct procedure. Upon solving equation (3) for $\frac{1}{w}\frac{\partial w\langle v_2' s'\rangle}{\partial x_2}$ we have

$$(12) \qquad -\frac{1}{w}\frac{\partial w\langle v_2' s'\rangle}{\partial x_2} = \frac{\partial \bar{s}}{\partial t} + \bar{v}_1\frac{\partial \bar{s}}{\partial x_1} + \bar{v}_2\frac{\partial \bar{s}}{\partial x_2} + \frac{1}{w}\frac{\partial w\langle v_1' s'\rangle}{\partial x_1} .$$

Since the terms on the right-hand side of equation (12) have been numerically evaluated, it is possible to find the vertical non-advective term by algebraically summing these various terms. Typical values of this term at Station J-17 are presented in the last column of Table VIII.

It is seen that the vertical non-advective term is composed of two parameters, the width w and the vertical deviation product $\langle v_2' s'\rangle$. Because a knowledge of the vertical variation of $\langle v_2' s'\rangle$ can be made to provide a verification of the technique adopted and because this term is identified with the classical diffusion term, its solution is carried out.

Integrating partially with respect to x_2, equation (12) gives for $\langle v_2' s'\rangle$

$$(13) \qquad -\langle v_2' s'\rangle = \frac{1}{w}\left[\int w\left\{\bar{v}_1\frac{\partial \bar{s}}{\partial x_1} + \bar{v}_2\frac{\partial \bar{s}}{\partial x_2} + \frac{1}{w}\frac{\partial w\langle v_1' s'\rangle}{\partial x_1} + \frac{\partial \bar{s}}{\partial t}\right\}dx_2 + C\right].$$

Solution of equation (13) requires an evaluation of the constant of integration C (which may be a function of x_1). Boundary conditions for this equation are that $\langle v_2' s'\rangle$ be zero at the surface (neglecting evaporation and precipitation) and the bottom. Only one of these conditions is required in the evaluation of C.

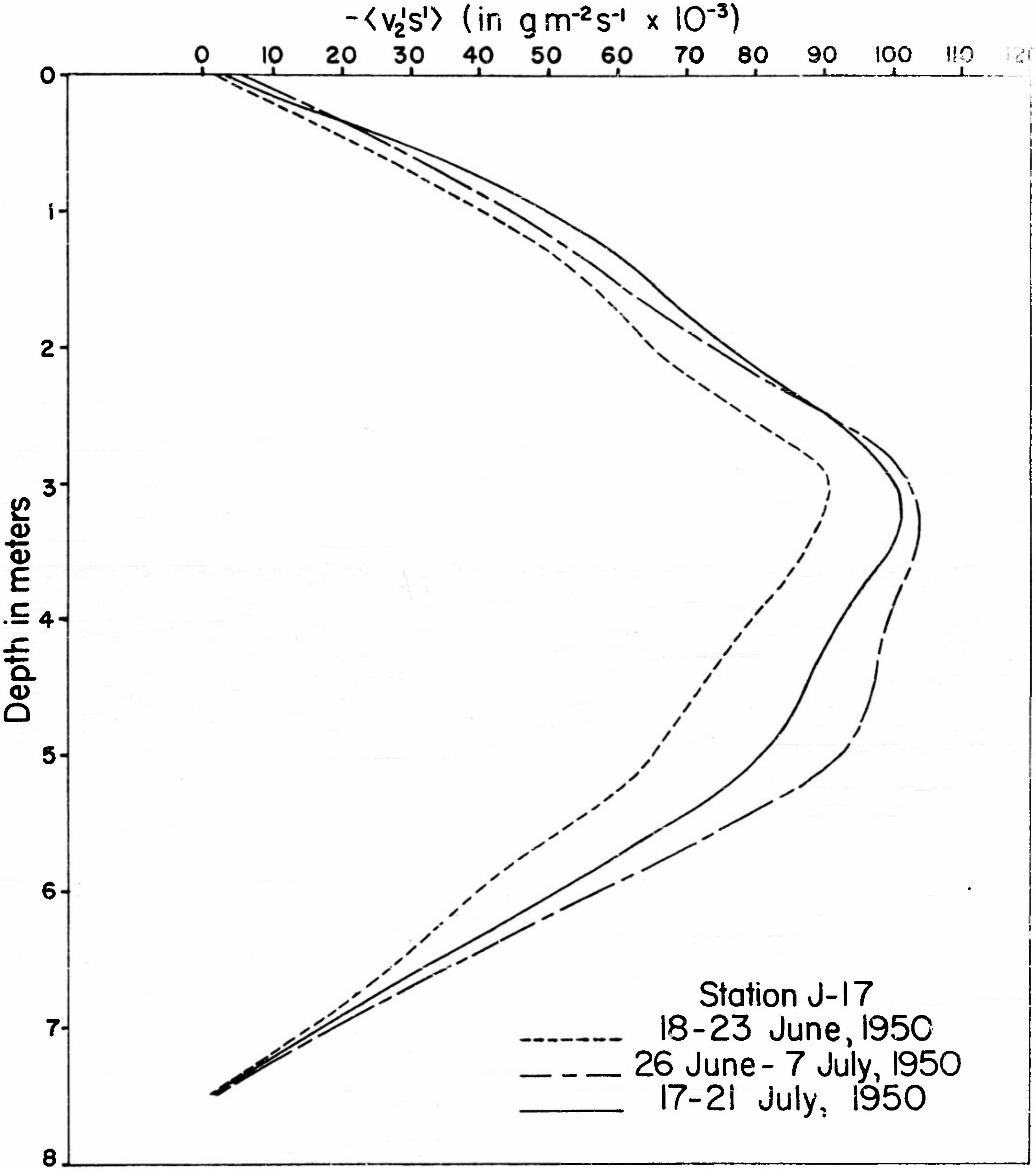
Setting $\langle v_2' s'\rangle$ equal to zero at the bottom permits the numerical evaluation of equation (13) to be carried out where, for convenience, the direction of integration is from bottom to surface. The results of such calculations for Station J-17 are given in Table VII for all periods.

Table VII

Values of $\langle U_2' S' \rangle$ for all periods at J-17

Depth (m)	18-23 June $\langle U_2' S' \rangle$ $(g m^{-2} s^{-1}) \times 10^4$	26 June-7 July $\langle U_2' S' \rangle$ $(g m^{-2} s^{-1}) \times 10^4$	17-21 July $\langle U_2' S' \rangle$ $(g m^{-2} s^{-1}) \times 10^4$
0.0	1.8	53.6	9.8
0.5	223.3	265.1	268.0
1.0	409.7	443.5	480.6
1.5	551.3	585.0	639.6
2.0	651.0	747.0	746.7
2.5	795.2	898.5	900.2
3.0	912.6	1024.4	1021.1
3.5	873.7	1030.9	994.0
4.0	789.9	987.9	919.3
4.5	726.7	973.9	883.6
5.0	647.9	927.9	823.0
5.5	527.7	779.9	688.2
6.0	398.7	583.0	520.9
6.5	280.2	384.4	351.7
7.0	150.0	183.9	174.3
7.5	0.0	0.0	0.0

The success of this integration in satisfying the surface boundary condition that $\langle U_2' S' \rangle$ be zero is a test of the validity of the method employed in this analysis. A plot of $\langle U_2' S' \rangle$ <u>versus</u> depth at Station J-17 for all periods is presented in Figure (7). It is seen that the boundary condition at the surface



$-\langle v_2's' \rangle$ (in g m^{-2}s^{-1} x 10^{-3})
0
10
20
30
40
50
60
70
80
90
100
110
120
0
1
2
3
4
5
6
7
8
Depth in meters
Station J-17
18-23 June, 1950
26 June - 7 July, 1950
17-21 July, 1950

FIGURE 7

is very nearly satisfied in all three cases, thus providing a measure of confidence in the procedure followed.

V. RESULTS

Table VIII lists values of the various components of equation (3) for Station J-17 during the period 18-23 June 1950.

Table VIII

Tabulation of Terms in Equation (3) at J-17 (18-23 June)

Depth (m)	$\partial \bar{s}/\partial t$ $(gm^{-3}s^{-1})\times 10^4$	$\bar{U}_1\, \partial \bar{s}/\partial x_1$ $(gm^{-3}s^{-1})\times 10^4$	$\bar{U}_2\, \partial \bar{s}/\partial x_2$ $(gm^{-3}s^{-1})\times 10^4$	$\frac{1}{\omega}\frac{\partial \omega \langle u_1' s'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1})\times 10^4$	$\frac{1}{\omega}\frac{\partial \omega \langle u_2' s'\rangle}{\partial x_2}$ $(gm^{-3}s^{-1})\times 10^4$
0.0	-4.2	484.0	0.0	1.29	-481.1
0.5	-3.6	407.0	-1.0	1.29	-403.7
1.0	-1.3	326.0	-1.4	1.29	-324.6
1.5	0.0	238.0	-1.9	0.61	-236.7
2.0	-0.1	159.0	-4.2	0.17	-154.9
2.5	0.1	88.0	-21.9	-1.00	- 65.2
3.0	0.8	- 8.0	-117.0	-0.76	+ 25.0
3.5	2.5	-118.0	-154.8	-0.64	+270.9
4.0	4.8	-219.0	-81.0	-0.58	+295.8
4.5	15.5	-279.0	-33.8	-0.62	+297.9
5.0	14.5	-288.0	-13.7	-0.44	+287.6
5.5	10.0	-278.0	-9.2	-0.68	+277.9
6.0	10.5	-278.0	-6.7	-1.17	+275.4
6.5	11.9	-286.0	-5.2	-0.60	+279.9
7.0	12.0	-318.0	3.5	-1.03	+312.8
7.5	12.0	-345.0	0.0	-0.09	+345.9

In terms of magnitude the results of the calculations show that the vertical non-advective term $\frac{1}{\bar{w}} \frac{\partial \bar{w}\overline{\langle U_2'S'\rangle}}{\partial x_2}$ and the horizontal advective term $\bar{U}_1 \frac{\partial \bar{S}}{\partial x_1}$ are of major importance in the salt balance equation. The vertical advective term $\bar{U}_2 \frac{\partial \bar{S}}{\partial x_2}$ is of considerable magnitude at middepths only, reaching a magnitude there comparable to that of $\bar{U}_1 \frac{\partial \bar{S}}{\partial x_1}$. The local time change of mean salinity $\frac{\partial \bar{S}}{\partial t}$ and the horizontal non-advective term $\frac{1}{\bar{w}} \frac{\partial \bar{w}\overline{\langle U_1'S'\rangle}}{\partial x_1}$ in all cases were one or more orders of magnitude less than the significant terms.

VI. THE RELATIONSHIP BETWEEN THE TIDE AND THE VERTICAL MIXING TERM

Since the tide is considered to be the most important factor governing mixing processes, it is worth while to investigate any possible establishment of a functional relationship between tidal velocities and the mean vertical deviation product $\overline{\langle U_2'S'\rangle}$.

The tidal velocities for each period of observation were available from the USC&GS current tables. The velocities are given at a reference station near the mouth of the James River. The velocity pattern at each of the stations investigation can be shown to be very similar to that given at the nearby reference station.

The vertical deviation product $\langle U_2'S'\rangle$ as obtained by the method described in this report was used in this analysis.

Since it was expedient to plot the data for all three stations on a single graph for convenience of observation, denominators of similar magnitude were obtained for the mean deviation products at each station by multiplying $\overline{\langle U_2'S'\rangle}$ by the mean value of $\underline{w}$ at that station. The procedure adopted in obtaining $\bar{w}\overline{\langle U_2'S'\rangle}$ is given in Table IX for all three stations.

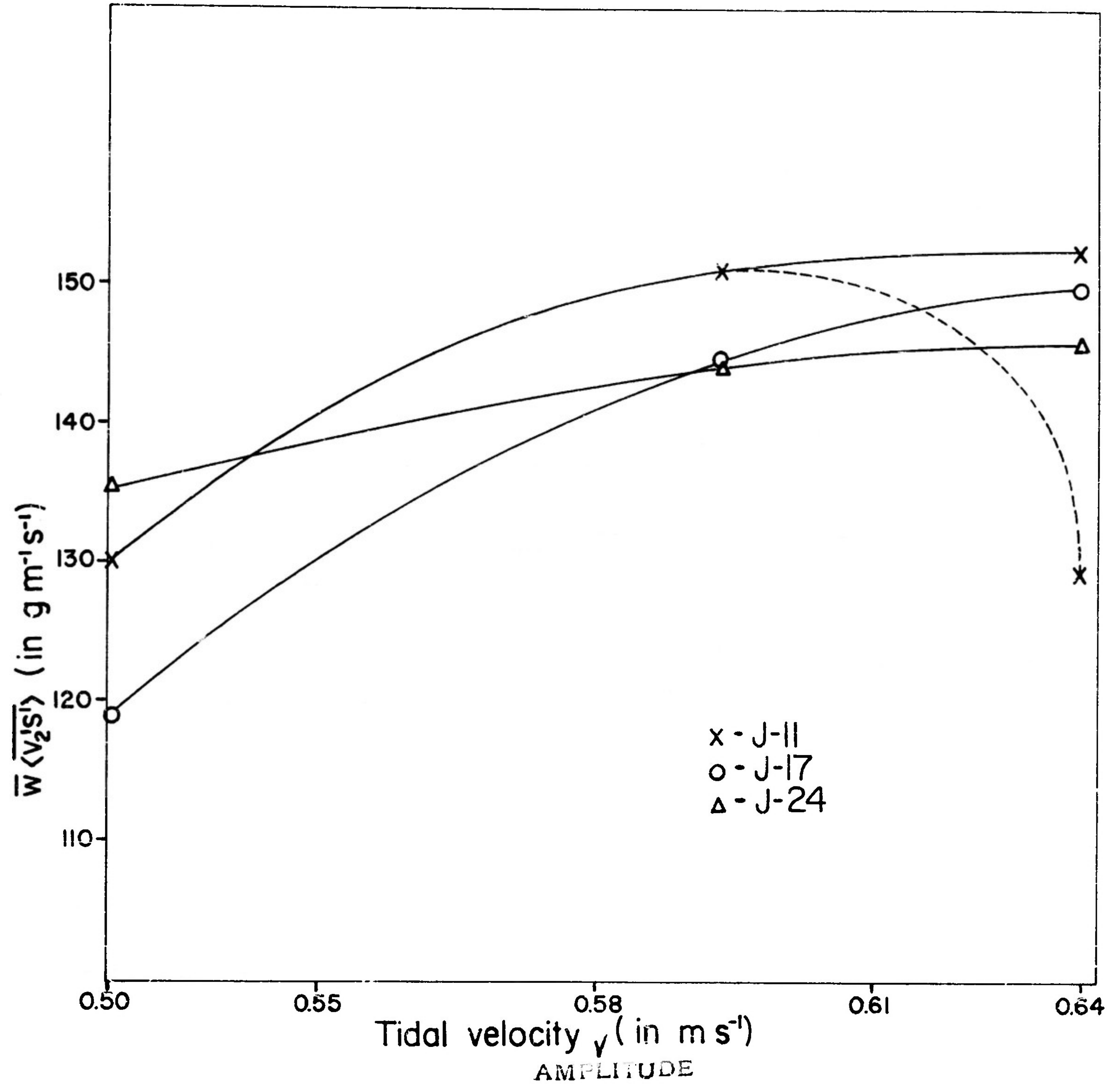

150
140
130
120
110
$\overline{W}\langle\overline{V_2'S'}\rangle$ (in g m^{-1}s^{-1})
x - J-11
o - J-17
Δ - J-24
0.50
0.55
0.58
0.61
0.64
Tidal velocity γ (in m s^{-1})
AMPLITUDE

FIGURE 8

Table IX

Evaluation of $\bar{\omega}\langle\overline{U_2' S'}\rangle$ for all stations and periods

Period	J-11			J-17			J-24		
	$\bar{\omega}$ (m)$\times 10^{-3}$	$\langle\overline{U_2' S'}\rangle$ (g$m^{-2}s^{-1}$)$\times 10^{4}$	$\bar{\omega}\langle\overline{U_2' S'}\rangle$ (gms^{-1})$\times 10$	$\bar{\omega}$ (m)$\times 10^{-3}$	$\langle\overline{U_2' S'}\rangle$ (g$m^{-2}s^{-1}$)$\times 10^{4}$	$\bar{\omega}\langle\overline{U_2' S'}\rangle$ (gms^{-1})$\times 10$	$\bar{\omega}$ (m)$\times 10^{-3}$	$\langle\overline{U_2' S'}\rangle$ (g$m^{-2}s^{-1}$)$\times 10^{4}$	$\bar{\omega}\langle\overline{U_2' S'}\rangle$ (gms^{-1})$\times 10$
18-23 June	3.10	418	1298	2.24	529	1186	1.72	786	1352
26 June-7 July	3.10	415	1287	2.24	666	1492	1.72	847	1457
17-21 July	3.10	487	1510	2.24	642	1439	1.72	839	1443

The plot of $\bar{\omega}\langle\overline{U_2' S'}\rangle$ versus tidal current velocity AMPLITUDE is presented in Figure 8 for all stations. That a relationship between the two parameters exists is apparent. Of the three sets of points obtained, one set for each station, it is seen that only one point belonging to the J-11 set is divergent from the general trend exhibited.

This result is significant since it not only confirms the hypothesis that the mixing processes are related to tidal action, but also offers a means of predicting the random terms.

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APPENDIX

All reduced data and their evaluations are presented in eleven tables for all periods at Stations J-11, J-17, and J-24.

Table I(a) - J-11

Depth (m)	18-23 June		26 June-7 July		17-21 July	
	$\bar{S}$ $(gm^{-3})\times 10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times 10^{3}$	$\bar{S}$ $(gm^{-3})\times 10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times 10^{3}$	$\bar{S}$ $(gm^{-3})\times 10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times 10^{3}$
0.0	15.26	-0.23	15.80	-0.12	14.45	0.02
0.5	15.34	00.23	15.90	-0.11	15.52	0.0
1.0	15.39	-0.24	16.07	-0.12	15.59	0.0
1.5	15.51	-0.14	16.14	-0.05	15.65	-0.02
2.0	15.71	-0.11	16.18	-0.10	15.75	0.01
2.5	16.04	-0.19	16.29	-0.13	16.03	-0.02
3.0	16.61	-0.13	16.57	-0.10	16.52	0.00
3.5	17.28	-0.23	17.16	-0.01	17.22	0.07
4.0	17.64	-0.24	17.50	-0.08	17.50	0.04
4.5	17.83	0.36	17.74	0.13	17.64	-0.29
5.0	17.76	0.44	17.82	0.13	17.74	-0.36
5.5	18.04	0.72	17.93	0.14	17.82	-0.55
6.0	18.12	1.00	18.02	0.26	12.87	-0.67
6.5	18.21	1.08	18.08	0.31	17.04	-0.65
7.0	18.29	0.96	18.18	0.24	18.10	-0.49
7.5	18.38	0.90	18.26	0.24	18.20	-0.49

Table I(b) - J-17

Depth (m)	18-23 June		26 June-7 July		17-21 July	
	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1}) \times 10^{3}$	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1}) \times 10^{3}$	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1}) \times 10^{3}$
0.0	10.86	-0.42	11.47	-0.18	10.72	-0.02
0.5	11.0	-0.36	11.67	-0.12	10.96	-0.05
1.0	11.06	-0.13	11.74	-0.11	11.04	-0.16
1.5	11.08	0.0	11.75	0.0	11.06	-0.19
2.0	11.12	-0.01	11.81	0.0	11.10	-0.11
2.5	11.16	0.01	12.04	0.1	11.25	-0.12
3.0	11.42	0.08	12.35	0.4	11.47	-0.19
3.5	12.52	0.25	12.74	0.4	12.49	-0.35
4.0	13.20	0.48	13.34	0.4	13.13	-0.49
4.5	13.52	1.55	13.62	0.53	13.46	-1.13
5.0	13.67	1.45	13.69	0.49	13.59	-1.09
5.5	13.76	1.00	13.73	0.38	13.63	-0.96
6.0	13.90	1.05	13.88	0.37	13.72	-0.87
6.5	14.14	1.19	14.08	0.37	13.88	-0.89
7.0	14.42	1.20	14.27	0.37	14.10	-0.94
7.5	14.72	1.20	14.45	0.37	14.33	-0.95

Table I(c) - J-24

Depth (m)	18-23 June		26 June-7 July		17-21 July	
	$\bar{S}$ $(gm^{-3})\times10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times10^{3}$	$\bar{S}$ $(gm^{-3})\times10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times10^{3}$	$\bar{S}$ $(gm^{-3})\times10^{-3}$	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times10^{3}$
0.0	4.14	-0.071	4.34	-0.071	4.08	-0.071
0.5	4.16	0.005	4.36	-0.080	4.13	-0.12
1.0	4.17	0.009	4.37	-0.094	4.14	-0.15
1.5	4.18	0.000	4.38	-0.075	4.15	-0.17
2.0	4.19	0.000	4.39	-0.13	4.17	-0.11
2.5	4.28	-0.042	4.41	-0.12	4.19	-0.11
3.0	4.45	0.000	4.53	-0.16	4.28	-0.061
3.5	4.98	-0.099	4.88	-0.11	4.65	-0.16
4.0	5.58	-0.052	5.48	-0.16	8.26	-0.075
4.5	5.78	0.130	5.70	-0.009	5.51	-0.056
5.0	5.88	0.16	5.81	0.014	5.61	-0.080
5.5	5.94	0.26	5.88	0.11	5.67	-0.094
6.0	6.01	0.26	5.96	0.11	5.77	-0.12
6.5	6.12	0.26	6.08	0.11	5.88	-0.12
7.0	6.18	0.29	6.14	0.11	5.94	-0.12
7.5	6.26	0.30	6.22	0.10	6.04	-0.23

Table II
J-11 (18-23 June)

Depth (m)	$\bar{S}$ $(gm^{-3})\times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	ω $(m)\times 10^{-3}$	$\bar{U}_1\omega$ $(m^2s^{-1})\times 10^{-3}$	$\bar{S}\bar{U}_1\omega$ $(gm^{-1}s^{-1})\times 10^{-6}$
0.0					
	15.30	0.161	4.30	0.692	10.59
0.5					
	15.36	0.117	4.30	0.503	7.73
1.0					
	15.45	0.080	4.30	0.344	5.31
1.5					
	15.61	0.048	4.30	0.206	3.26
2.0					
	15.88	0.018	3.32	0.060	0.95
2.5					
	16.33	-0.013	3.14	-0.041	-0.67
3.0					
	16.95	-0.045	2.98	-0.134	-2.27
3.5					
	17.47	-0.077	2.76	-0.213	-3.72
4.0					
	17.74	-0.102	2.55	-0.260	-4.61
4.5					
	17.80	-0.108	2.41	-0.260	-4.63
5.0					
	18.00	-0.101	2.27	-0.229	-4.12
5.5					
	18.08	-0.086	2.09	-0.180	-3.25
6.0					
	18.17	-0.074	1.83	-0.135	-2.45
6.5					
	18.25	-0.070	1.48	-0.104	-1.90
7.0					

Table II
J-11 (June 26 - July 7)

Depth (m)	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	w $(m) \times 10^{-3}$	$\bar{U}_1 w$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{S}\bar{U}_1 w$ $(gm^{-1} s^{-1}) \times 10^{-6}$
0.0					
	15.85	0.165	4.16	0.686	10.87
0.5					
	15.98	0.132	4.16	0.549	8.77
1.0					
	16.11	0.099	4.16	0.412	6.64
1.5					
	16.16	0.063	4.16	0.262	4.23
2.0					
	16.23	0.019	3.32	0.063	1.02
2.5					
	16.43	-0.025	3.14	-0.079	-1.30
3.0					
	16.87	-0.055	2.98	-0.164	-2.77
3.5					
	17.33	-0.074	2.76	-0.204	-3.54
4.0					
	17.62	-0.087	2.55	-0.222	-3.91
4.5					
	17.78	-0.098	2.41	-0.236	-4.20
5.0					
	17.88	-0.105	2.27	-0.238	-4.26
5.5					
	17.98	-0.112	2.09	-0.234	-4.21
6.0					
	18.05	-0.116	1.83	-0.212	-3.83
6.5					
	18.13	-0.119	1.48	-0.176	-3.19
7.0					

Table II
J-11 (17-21 July)

Depth (m)	$\bar{S}$ $(gm^{-3})\times10^{-3}$	$\bar{U}_i$ (ms^{-1})	ω $(m)\times10^{-3}$	$\bar{U}_i\omega$ $(m^2s^{-1})\times10^{-3}$	$\bar{S}\bar{U}_i\omega$ $(gm^{-1}s^{-1})\times10^{-6}$
0.0					
	15.49	0.173	4.43	0.766	11.87
0.5					
	15.56	0.137	4.43	0.607	9.44
1.0					
	15.62	0.095	4.43	0.422	6.58
1.5					
	15.70	0.055	4.43	0.244	3.83
2.0					
	15.89	0.021	3.32	0.070	1.11
2.5					
	16.28	-0.011	3.14	-0.035	-0.58
3.0					
	16.87	-0.046	2.98	-0.137	-2.31
3.5					
	17.36	-0.074	2.76	-0.204	-3.54
4.0					
	17.57	-0.116	2.55	-0.296	-5.20
4.5					
	17.69	-0.127	2.41	-0.306	-5.41
5.0					
	17.78	-0.120	2.27	-0.272	-4.84
5.5					
	17.85	-0.113	2.09	-0.236	-4.21
6.0					
	17.90	-0.110	1.83	-0.201	-3.60
6.5					
	18.02	-0.110	1.48	-0.163	-2.94
7.0					

Table II
J-17 (18-23 June)

Depth (m)	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	w $(m) \times 10^{-3}$	$\bar{U}_1 w$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{S}\bar{U}_1 w$ $(gm^{-1} s^{-1}) \times 10^{-6}$
0.0					
	10.93	0.116	3.03	0.351	3.84
0.5					
	11.03	0.095	3.03	0.288	3.18
1.0					
	11.07	0.074	3.03	0.224	2.48
1.5					
	11.10	0.051	3.03	0.155	1.72
2.0					
	11.13	0.032	3.01	0.096	1.07
2.5					
	11.27	0.010	2.48	0.025	0.28
3.0					
	11.96	-0.015	2.24	-0.034	-0.41
3.5					
	12.28	-0.040	2.10	-0.084	-1.03
4.0					
	13.36	-0.061	1.91	-0.117	-1.56
4.5					
	13.60	-0.071	1.71	-0.121	-1.65
5.0					
	13.72	-0.071	1.59	-0.113	-1.55
5.5					
	13.83	-0.070	1.56	-0.109	-1.51
6.0					
	14.02	-0.071	1.49	-0.106	-1.49
6.5					
	14.28	-0.076	1.39	-0.106	-1.51
7.0					
	14.57	-0.083	1.23	-0.102	-1.49
7.5					

Table II
J-17 (26 June - 7 July)

Depth (m)	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	ω $(m) \times 10^{-3}$	$\bar{U}_1\omega$ $(m^2s^{-1}) \times 10^{-3}$	$\bar{S}\bar{U}_1\omega$ $(gm^{-1}s^{-1}) \times 10^{-6}$
0.0					
	11.58	0.121	3.31	0.401	4.64
0.5					
	11.71	0.101	3.31	0.334	3.91
1.0					
	11.74	0.080	3.31	0.265	3.11
1.5					
	11.78	0.057	3.31	0.189	2.23
2.0					
	11.93	0.035	3.01	0.105	1.25
2.5					
	12.19	0.009	2.48	0.022	0.27
3.0					
	12.55	-0.015	2.24	-0.034	-0.43
3.5					
	13.04	-0.035	2.10	-0.074	-0.96
4.0					
	13.48	-0.051	1.91	-0.097	-1.31
4.5					
	13.65	-0.070	1.71	-0.120	-1.64
5.0					
	13.71	-0.092	1.59	-0.146	-2.00
5.5					
	13.80	-0.109	1.59	-0.170	-2.35
6.0					
	13.98	-0.117	1.49	-0.174	-2.43
6.5					
	14.17	-0.115	1.39	-0.160	-2.27
7.0					
	14.36	-0.107	1.23	-0.132	-1.90
7.5					

Table II
J-17 (17-21 July)

Depth (m)	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	ω $(m) \times 10^{-3}$	$\bar{U}_1\omega$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{S}\bar{U}_1\omega$ $(gm^{-1} s^{-1}) \times 10^{-6}$
0.0					
	10.84	0.131	3.06	0.401	4.35
0.5					
	11.00	0.107	3.06	0.327	3.60
1.0					
	11.05	0.079	3.06	0.242	2.67
1.5					
	11.08	0.052	3.06	0.159	1.76
2.0					
	11.18	0.031	3.01	0.093	1.04
2.5					
	11.36	0.011	2.48	0.027	0.31
3.0					
	11.91	-0.014	2.24	-0.031	-0.37
3.5					
	12.81	-0.036	2.10	-0.076	-0.97
4.0					
	13.30	-0.051	1.91	-0.097	-1.29
4.5					
	13.52	-0.066	1.71	-0.113	-1.53
5.0					
	13.61	-0.079	1.59	-0.126	-1.71
5.5					
	13.68	-0.090	1.56	-0.140	-1.92
6.0					
	13.80	-0.097	1.49	-0.145	-2.00
6.5					
	13.99	-0.099	1.39	-0.138	-1.93
7.0					
	14.22	-0.100	1.23	-0.123	-1.75
7.5					

Table II
J-24-A (18-23 June)

Depth (m)	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	w $(m) \times 10^{-3}$	$\bar{U}_1 w$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{S}\bar{U}_1 w$ $(gm^{-1} s^{-1}) \times 10^{-6}$
0.0					
	4.15	0.173	3.47	0.600	2.49
0.5					
	4.16	0.075	3.47	0.261	1.08
1.0					
	4.18	0.020	3.47	0.069	0.29
1.5					
	4.19	-0.012	2.42	-0.030	-0.13
2.0					
	4.23	-0.033	1.84	-0.061	-0.26
2.5					
	4.38	-0.052	1.44	-0.075	-0.33
3.0					
	4.71	-0.065	1.24	-0.081	-0.38
3.5					
	5.36	-0.073	1.17	-0.085	-0.46
4.0					
	5.70	-0.078	1.04	-0.081	-0.46
4.5					
	5.83	-0.080	0.93	-0.074	-0.43
5.0					
	5.91	-0.080	0.84	-0.067	-0.40
5.5					
	5.97	-0.080	0.61	-0.049	-0.29
6.0					
	6.08	-0.080	0.53	-0.042	-0.26
6.5					
	6.15	-0.080	0.48	-0.037	-0.23
7.0					

Table II
J-24-A (26 June - 7 July)

Depth (m)	$\bar{S}$ $(gm^{-3}) \times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	w $(m) \times 10^{-3}$	$\bar{U}_1 w$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{S}\bar{U}_1 w$ $(gm^{-1}s^{-1}) \times 10^{-6}$
0.0					
	4.35	0.173	3.11	0.538	2.34
0.5					
	4.36	0.094	3.11	0.292	1.27
1.0					
	4.37	0.027	3.11	0.084	0.37
1.5					
	4.38	-0.016	2.42	-0.039	-0.039
2.0					
	4.40	-0.043	1.84	-0.079	-0.35
2.5					
	4.46	-0.055	1.44	-0.079	-0.35
3.0					
	4.71	-0.058	1.24	-0.072	-0.34
3.5					
	5.18	-0.059	1.17	-0.069	-0.36
4.0					
	5.60	-0.060	1.04	-0.062	-0.35
4.5					
	5.76	-0.066	0.93	-0.061	-0.35
5.0					
	5.84	-0.084	0.84	-0.071	-0.42
5.5					
	5.92	-0.102	0.61	-0.062	-0.37
6.0					
	6.02	-0.110	0.53	-0.058	-0.35
6.5					
	6.11	-0.110	0.48	-0.053	-0.32
7.0					

Table II
J-24-A (17-21 July)

Depth (m)	$\bar{S}$ $(gm^{-3})\times 10^{-3}$	$\bar{U}_1$ (ms^{-1})	ω $(m)\times 10^{-3}$	$\bar{U}_1\omega$ $(m^2s^{-1})\times 10^{-3}$	$\bar{S}\bar{U}_1\omega$ $(gm^{-1}s^{-1})\times 10^{-6}$
0.0					
	4.11	0.185	3.59	0.664	2.73
0.5					
	4.13	0.101	3.59	0.363	1.50
1.0					
	4.14	0.029	3.59	0.104	0.43
1.5					
	4.16	-0.016	2.42	-0.039	-0.16
2.0					
	4.18	-0.045	1.84	-0.083	-0.35
2.5					
	4.25	-0.064	1.44	-0.092	-0.39
3.0					
	4.48	-0.077	1.24	-0.095	-0.43
3.5					
	4.97	-0.088	1.17	-0.103	-0.51
4.0					
	5.39	-0.095	1.04	-0.099	-0.53
4.5					
	5.56	-0.102	0.93	-0.095	-0.53
5.0					
	5.64	-0.106	0.84	-0.089	-0.50
5.5					
	5.72	-0.108	0.61	-0.066	-0.38
6.0					
	5.82	-0.109	0.53	-0.058	-0.34
6.5					
	5.91	-0.109	0.48	0.052	-0.31
7.0					

Table III

Sta.	Period	$\Sigma\, \omega \Delta x_2$ $(m^2) \times 10^{-3}$	$\Sigma\, \bar{u}_1 \omega \Delta x_2$ $(m^3 s^{-1}) \times 10^{-3}$	$\Sigma\, \bar{s} \bar{u}_1 \omega \Delta x_2$ $(g s^{-1}) \times 10^{-6}$	$\langle u_1' s' \rangle$ $(g m^{-2} s^{-1}) \times 10^{-3}$
J-11	18-23 June	21.01	0.124	0.110	-0.005
	26 June-7 July	20.73	0.104	0.160	-0.007
	17-21 July	21.27	0.130	0.100	-0.004
J-17	18-23 June	16.41	0.124	0.185	-0.011
	26 June-7 July	16.97	0.104	0.065	-0.003
	17-21 July	16.47	0.130	0.130	-0.007
J-24	18-23 June	11.47	0.124	0.120	-0.010
	26 June-7 July	10.93	0.104	0.130	-0.011
	17-21 July	11.65	0.130	0.120	-0.010

Table IV
J-11 (18-23 June)

Depth (m)	ω (m) $\times 10^{-3}$	$\langle u_i's'\rangle$ $(gm^{-2}s^{-1}) \times 10^{-3}$	$w\langle u_i's'\rangle$ $(gm^{-1}s^{-1}) \times 10^{-3}$	$\frac{\partial w\langle u's'\rangle}{\partial x_1}$ $(gm^{-2}s^{-1}) \times 10$	$\frac{1}{\omega}\frac{\partial w\langle u_i's'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1}) \times 10^{4}$
0.0	4.30	-0.005	-22.0	11.8	2.74
0.5	4.30	-0.005	-22.0	11.8	2.74
1.0	4.30	-0.005	-22.0	11.8	2.74
1.5	4.30	-0.005	-22.0	11.9	2.75
2.0	3.71	-0.005	-18.0	17.1	4.61
2.5	3.21	-0.005	-16.0	19.9	6.20
3.0	3.06	-0.005	-15.0	16.1	5.26
3.5	2.88	-0.005	-14.0	13.7	4.76
4.0	2.64	-0.005	-13.0	11.8	4.47
4.5	2.49	-0.005	-12.0	9.50	3.82
5.0	2.35	-0.005	-12.0	7.65	3.25
5.5	2.19	-0.005	-10.0	9.28	4.24
6.0	1.98	-0.005	-10.0	9.28	4.69
6.5	1.69	-0.005	- 8.5	9.94	5.88
7.0	1.19	-0.005	- 5.9	12.5	10.50
7.5	0.59	-0.005	- 2.9	12.3	20.85

Table IV
J-11 (26 June-7 July)

Depth (m)	ω (m) $\times 10^{-5}$	$\langle v_1's' \rangle$ $(gm^{-2}s^{-1}) \times 10^{-3}$	$\omega \langle v_1's' \rangle$ $(gm^{-1}s^{-1}) \times 10^{-3}$	$\frac{\partial \omega \langle v_1's' \rangle}{\partial x_1}$ $(gm^{-2}s^{-1}) \times 10$	$\frac{1}{\omega} \frac{\partial \omega \langle v_1's' \rangle}{\partial x_1}$ $(gm^{-3}s^{-1}) \times 10^4$
0.0	4.16	-0.007	-29.0	-36.2	-8.42
0.5	4.16	-0.007	-29.0	-36.2	-8.42
1.0	4.16	-0.007	-29.0	-36.2	-8.42
1.5	4.16	-0.007	-29.0	-36.2	-8.42
2.0	3.71	-0.007	-26.0	-24.2	-6.52
2.5	3.21	-0.007	-23.0	-18.9	-5.89
3.0	3.06	-0.007	-21.0	-16.0	-5.23
3.5	2.88	-0.007	-20.0	-15.1	-5.24
4.0	2.64	-0.007	-18.0	-12.7	-4.89
4.5	2.49	-0.007	-17.0	-12.2	-4.90
5.0	2.35	-0.007	-16.0	-11.7	-4.98
5.5	2.19	-0.007	-15.0	-10.9	-4.98
6.0	1.98	-0.007	-14.0	-10.0	-5.05
6.5	1.69	-0.007	-12.0	- 8.61	-5.09
7.0	1.19	-0.007	-8.3	- 6.10	-5.13
7.5	0.59	-0.007	-4.1	- 1.32	-2.24

Table IV
J-11 (17-21 July)

Depth (m)	ω (m) $\times 10^{-3}$	$\langle v_i' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^{-3}$	$\omega \langle v_i' s' \rangle$ $(gm^{-1}s^{-1}) \times 10^{-3}$	$\frac{\partial \omega \langle u_i' s' \rangle}{\partial x_i}$ $(gm^{-2}s^{-1}) \times 10$	$\frac{1}{\omega} \frac{\partial \omega \langle u_i' s' \rangle}{\partial x_i}$ $(gm^{-3}s^{-1}) \times 10^{4}$
0.0	4.43	-0.004	-18.0	-2.21	-0.51
0.5	4.43	-0.004	-18.0	-2.21	-0.51
1.0	4.43	-0.004	-18.0	-2.21	-0.51
1.5	4.43	-0.004	-18.0	-1.48	-0.34
2.0	3.71	-0.004	-15.0	3.62	0.98
2.5	3.21	-0.004	-13.0	5.60	1.75
3.0	3.06	-0.004	-12.0	5.35	1.75
3.5	2.88	-0.004	-12.0	4.55	1.58
4.0	2.64	-0.004	-11.0	5.05	1.91
4.5	2.49	-0.004	-10.0	5.40	2.17
5.0	2.35	-0.004	- 9.3	4.29	1.83
5.5	2.19	-0.004	- 8.7	4.65	2.12
6.0	1.98	-0.004	- 7.9	3.98	2.01
6.5	1.69	-0.004	- 6.8	5.10	3.02
7.0	1.19	-0.004	- 4.7	6.10	5.13
7.5	0.59	-0.004	- 2.4	6.10	10.34

Table IV
J-17 (18-23 June)

Depth (m)	ω $(m) \times 10^{-3}$	$\langle \upsilon_1' s' \rangle$ $(g m^{-2} s^{-1}) \times 10^{-3}$	$\omega \langle \upsilon_1' s' \rangle$ $(g m^{-1} s^{-1}) \times 10^{3}$	$\frac{\partial \omega \langle u_1' s' \rangle}{\partial x_1}$ $(g m^{-2} s^{-1}) \times 10$	$\frac{1}{\omega} \frac{\partial \omega \langle u_1' s' \rangle}{\partial x_1}$ $(g m^{-3} s^{-1}) \times 10^{4}$
0.0	3.03	+0.011	-33.0	3.92	1.29
0.5	3.03	-0.11	-33.0	3.92	1.29
1.0	3.03	-0.11	-33.0	3.92	1.29
1.5	3.03	-0.11	-33.0	1.86	0.61
2.0	3.02	-0.011	-33.0	0.51	0.17
2.5	2.69	-0.011	-29.0	-27.0	-1.00
3.0	2.34	-0.011	-26.0	-1.78	-0.76
3.5	2.17	-0.011	-24.0	-1.38	-0.64
4.0	2.02	-0.011	-22.0	-1.17	-0.58
4.5	1.80	-0.011	-19.0	-1.12	-0.62
5.0	1.63	-0.011	-18.0	-0.71	-0.44
5.5	1.57	-0.011	-17.0	-1.07	-0.68
6.0	1.53	-0.011	-17.0	-1.79	-1.17
6.5	1.44	-0.011	-16.0	-0.87	-0.60
7.0	1.34	-0.011	-15.0	-1.38	-1.03
7.5	1.06	-0.011	-11.0	-0.10	-0.09

Table IV
J-17 (26 June-7 July)

Depth (m)	ω (m) $\times 10^{-3}$	$\langle v_1' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^{-3}$	$\omega \langle v_1' s' \rangle$ $(gm^{-1}s^{-1}) \times 10^{-3}$	$\frac{\partial \omega \langle v_1' s' \rangle}{\partial x_1}$ $(gm^{-2}s^{-1}) \times 10$	$\frac{1}{\omega} \frac{\partial \omega \langle v_1' s' \rangle}{\partial x_1}$ $(gm^{-3}s^{-1}) \times 10^{4}$
0.0	3.31	-0.003	-10.1	-1.83	-0.60
0.5	3.31	-0.003	-10.1	-1.83	-0.60
1.0	3.31	-0.003	-10.1	-1.83	-0.60
1.5	3.31	-0.003	-10.1	-1.83	-0.60
2.0	3.02	-0.003	- 9.0	-1.17	-0.39
2.5	2.69	-0.003	- 8.1	-1.63	-0.61
3.0	2.34	-0.003	- 7.0	-1.27	-0.54
3.5	2.17	-0.003	- 6.5	-1.89	-0.87
4.0	2.02	-00.03	- 6.1	-2.30	-1.14
4.5	1.80	-0.003	- 5.4	-2.30	-1.28
5.0	1.63	-0.003	- 4.9	-2.34	-1.44
5.5	1 57	-0.003	- 4.7	-2.34	-1.49
6.0	1.53	-0.003	- 4.6	-2.34	-1.53
6.5	1.44	-0.003	- 4.3	-2.34	-1.63
7.0	1.34	-0.003	- 4.0	-0.46	-0.34
7.5	1.06	-0.003	- 3.2	-0.08	-0.08

Table IV
J-17 (17-21 July)

Depth (m)	ω (m) $\times 10^{-3}$	$\langle v_1' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^{-3}$	$\omega \langle v_1' s' \rangle$ $(gm^{-1}s^{-1}) \times 10^{-3}$	$\frac{\partial \omega \langle v_1' s' \rangle}{\partial x_1}$ $(gm^{-2}s^{-1}) \times 10$	$\frac{1}{\omega} \frac{\partial \omega \langle v_1' s' \rangle}{\partial x_1}$ $(gm^{-3}s^{-1}) \times 10^{4}$
0.0	3.06	-0.007	-21.0	15.3	5.05
0.5	3.06	-0.007	-21.0	15.3	5.05
1.0	3.06	-0.007	-21.0	15.3	5.05
1.5	3.06	-0.007	-21.0	5.95	1.96
2.0	3.02	-0.007	-21.0	4.69	1.55
2.5	2.69	-0.007	-19.0	2.30	0.86
3.0	2.34	-0.007	-16.0	0.0	0.0
3.5	2.17	-0.007	-15.0	0.0	0.0
4.0	2.02	-0.007	-14.0	-0.51	0.25
4.5	1.80	-0.007	-13.0	-0.56	-0.31
5.0	1.63	-0.007	-11.0	-1.03	-0.63
5.5	1.57	-0.007	-11.0	-1.32	-0.84
6.0	1.53	-0.007	-10.0	-1.43	-0.93
6.5	1.44	-0.007	-10.0	-1.73	-1.20
7.0	1.34	-0.007	- 9.2	-0.51	-0.38
7.5	1.06	-0.007	- 7.4	0.51	-0.48

Table IV
J-24 (18-23 June)

Depth (m)	ω (m) $\times 10^{-3}$	$\langle v_i's' \rangle$ $(gm^{-2}s^{-1}) \times 10^{-3}$	$\omega \langle u_i's' \rangle$ $(gm^{-1}s^{-1}) \times 10^{-3}$	$\frac{\partial \omega \langle u_i's' \rangle}{\partial x_i}$ $(gm^{-2}s^{-1}) \times 10$	$\frac{1}{\omega} \frac{\partial \omega \langle u_i's' \rangle}{\partial x_i}$ $(gm^{-3}s^{-1}) \times 10^{4}$
0.0	3.47	-0.010	-35.0	0.56	0.16
0.5	3.47	-0.010	-35.0	0.56	0.16
1.0	3.47	-0.010	-35.0	0.56	0.16
1.5	2.71	-0.010	-27.0	-13.2	-4.87
2.0	2.12	-0.010	-21.0	-24.9	-11.74
2.5	1.62	-0.010	-16.0	-21.8	-13.16
3.0	1.32	-0.010	-13.0	-20.8	-15.76
3.5	1.20	-0.010	-12.0	-18.1	-15.08
4.0	1.13	-0.010	-11.0	-16.7	-14.78
4.5	0.96	-0.010	-10.0	-13.6	-14.17
5.0	0.90	+0.010	- 9.0	-14.2	-15.78
5.5	0.71	-0.010	- 7.1	-16.1	-22.68
6.0	0.55	-0.010	- 5.5	-16.8	-30.55
6.5	0.51	-0.010	- 5.1	-19.5	-38.23
7.0	0.46	-0.010	- 4.6	-15.3	-33.26
7.5	0.41	-0.010	- 4.1	-11.5	-28.05

Table IV
J-24 (26 June-7 July)

Depth (m)	ω (m) $\times 10^{-3}$	$\langle v_i's' \rangle$ $(gm^{-2}s^{-1}) \times 10^{-3}$	$\omega \langle v_i's' \rangle$ $(gm^{-1}s^{-1}) \times 10^{-3}$	$\frac{\partial \omega \langle u_i's' \rangle}{\partial x_i}$ $(gm^{-2}s^{-1}) \times 10$	$\frac{1}{\omega} \frac{\partial \omega \langle u_i's' \rangle}{\partial x_i}$ $(gm^{-3}s^{-1}) \times 10^{4}$
0.0	3.11	-0.011	-34.0	54.6	15.74
0.5	3.11	-0.011	-34.0	54.6	15.74
1.0	3.11	-0.011	-34.0	54.6	15.74
1.5	2.71	-0.011	-30.0	36.6	13.50
2.0	2.12	-0.011	-23.0	25.1	11.84
2.5	1.62	-0.011	-18.0	25.0	15.43
3.0	1.32	-0.011	-15.0	15.4	11.67
3.5	1.20	-0.011	-13.0	12.2	10.17
4.0	1.13	-0.011	-12.0	12.1	10.71
4.5	0.96	-0.011	-11.0	11.2	11.67
5.0	0.90	-0.011	-10.0	10.3	11.44
5.5	0.71	-0.011	- 7.8	6.32	8.90
6.0	0.55	-0.011	- 6.1	3.16	5.74
6.5	0.51	-0.011	- 5.6	1.63	3.20
7.0	0.46	-0.011	- 5.1	0.46	1.00
7.5	0.41	-0.011	- 4.5	0.46	1.00

Table IV
J-24 (17-21 July)

Depth (m)	ω (m) $\times 10^{-3}$	$\langle v_i' s' \rangle$ $(g\,m^{-2}s^{-1}) \times 10^{-3}$	$\omega \langle v_i' s' \rangle$ $(g\,m^{-1}s^{-1}) \times 10^{-3}$	$\frac{\partial \omega \langle u_i' s' \rangle}{\partial x_i}$ $(g\,m^{-2}s^{-1}) \times 10$	$\frac{1}{\omega} \frac{\partial \omega \langle u_i' s' \rangle}{\partial x_i}$ $(g\,m^{-3}s^{-1}) \times 10^{4}$
0.0	3.59	-0.010	-35.0	13.4	3.86
0.5	3.59	-0.010	-35.0	13.4	3.86
1.0	3.59	-0.010	-35.0	13.4	3.86
1.5	2.71	-0.010	-27.0	4.44	1.64
2.0	2.12	-0.010	-21.0	-3.22	-1.52
2.5	1.62	-0.010	-16.0	-56.1	-3.46
3.0	1.32	-0.010	-13.0	-4.49	-3.40
3.5	1.20	-0.010	-12.0	-4.38	-3.65
4.0	1.13	-0.010	-11.0	-4.44	-3.93
4.5	0.96	-0.010	-10.0	-4.44	-4.62
5.0	0.90	-0.010	- 9.0	-2.34	-2.60
5.5	0.71	-0.010	- 7.1	-5.20	-7.32
6.0	0.55	-0.010	- 5.5	-6.34	-11.53
6.5	0.51	-0.010	- 5.1	-6.58	-12.90
7.0	0.46	-0.010	- 4.6	-7.00	-15.22
7.5	0.41	-0.010	- 4.1	-5.91	-14.41

Table V
Segment 17-11 (18-23 June)

Depth (m)	$\overline{U}_1 \omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma \overline{U}_1 \omega \Delta x_2]_{17}$ $(m^3s^{-1})\times10^{-3}$	$\overline{U}_1 \omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma \overline{U}_1 \omega \Delta x_2]_{11}$ $(m^3s^{-1})\times10^{-3}$	$\Delta\Sigma \overline{U}_1 \omega \Delta x_2$ $(m^3s^{-1})\times10^{-3}$	$\overline{\omega}$ $(m)\times10^{-3}$	$\overline{\omega} L$ $(m^2)\times10^{-7}$	$\overline{U}_2$ $(ms^{-1})\times10^{5}$	$\overline{U}_2$ * $(ms^{-1})\times10^{5}$
0.0		0.00		0.00	0.00	3.66	4.81	0.00	0.00
	0.351		0.692						
0.5		0.351		0.692	-0.341	3.66	4.81	-0.36	-0.42
	0.288		0.503						
1.0		0.639		1.195	-0.556	3.66	4.81	-0.58	-0.64
	0.224		0.344						
1.5		0.863		1.539	-0.676	3.66	4.81	-0.70	-0.75
	0.155		0.206						
2.0		0.018		1.745	-0.727	3.37	4.43	-0.82	-0.81
	0.096		0.060						
2.5		1.114		1.805	-0.691	2.95	3.88	-0.89	-0.86
	0.025		-0.041						
3.0		1.139		1.764	-0.625	2.70	3.55	-0.88	-0.80
	-0.034		-0.134						
3.5		1.105		1.630	-0.525	2.52	3.31	-0.79	-0.74
	-0.084		-0.213						
4.0		1.021		1.417	-0.396	2.33	3.06	-0.65	-0.57
	-0.117		-0.260						
4.5		0.904		1.157	-0.253	2.15	2.83	-0.45	-0.35
	-0.121		-0.260						
5.0		0.783		0.897	-0.114	1.99	2.62	-0.22	-0.10
	-0.113		-0.229						
5.5		0.670		0.668	0.002	1.88	2.47	0.00	0.10
	-0.109		-0.180						
6.0		0.561		0.488	0.073	1.75	2.30	0.16	0.27
	-0.106		-0.135						
6.5		0.455		0.353	0.102	1.57	2.06	0.25	0.34
	-0.106		-0.104						
7.0		0.349		0.249	0.100	1.27	1.67	0.30	0.39
	-0.102		-0.079						
7.5		0.247		0.170	0.034	0.83	1.09	0.04	0.02

* $\overline{U}_2$ - extrapolated to J-11

Table V
Segment 17-11 (26 June-7 July)

Depth (m)	$\overline{v}_1\omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\overline{v}_1\omega\Delta x_2]_{17}$ $(m^3s^{-1})\times10^{-3}$	$\overline{v}_1\omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\overline{v}_1\omega\Delta x_2]_{11}$ $(m^3s^{-1})\times10^{-3}$	$\Delta\Sigma\overline{v}_1\omega\Delta x_2$ $(m^3s^{-1})\times10^{-3}$	$\overline{\omega}$ $(m)\times10^{-3}$	$\overline{\omega}L$ $(m^2)\times10^{-7}$	$\overline{v}_2$ $(ms^{-1})\times10^{5}$	$\overline{v}_{2*}$ $(ms^{-1})\times10^{5}$
0.0		0		0	0	3.73	4.88	0.00	-0.00
	0.401		0.686						
0.5		0.401		0.686	-0.285	3.73	4.88	-0.30	-0.36
	0.334		0.549						
1.0		0.735		1.235	-0.500	3.73	4.88	-0.51	-0.56
	0.265		0.412						
1.5		1.000		1.647	-0.647	3.73	4.88	-0.68	-0.69
	0.189		0.262						
2.0		1.189		1.909	-0.720	3.37	4.43	-0.81	-0.82
	0.105		0.063						
2.5		1.294		1.830	-0.536	2.95	3.88	-0.69	-0.62
	0.022		-0.079						
3.0		1.316		1.666	-0.350	2.70	3.55	-0.49	-0.39
	-0.034		-0.164						
3.5		1.282		1.502	-0.220	2.52	3.31	-0.33	-0.21
	-0.074		-0.204						
4.0		1.208		1.298	-0.090	2.33	3.06	-0.15	-0.02
	-0.097		-0.222						
4.5		1.111		1.076	0.035	2.15	2.83	-0.06	0.18
	-0.120		-0.236						
5.0		0.991		0.840	0.151	1.99	2.62	0.29	0.45
	-0.146		-0.238						
5.5		0.845		0.602	0.240	1.88	2.47	0.49	0.69
	-0.170		-0.234						
6.0		0.675		0.368	0.307	1.75	2.30	0.67	0.88
	-0.174		-0.212						
6.5		0.501		0.156	0.345	1.57	2.06	0.84	1.00
	-0.160		-0.176						
7.0		0.341		-0.020	0.361	1.27	1.67	1.08	1.17
	-0.132		-0.152						
7.5		0.209		-0.172	0.096	0.83	1.09	0.87	0.97

Table V
Segment 17-11 (17-21 July)

Depth (m)	$\overline{v}_1 \omega$ $(m^2 s^{-1}) \times 10^{-3}$	$\Sigma \overline{v}_1 \omega \Delta x_2]_I$ $(m^3 s^{-1}) \times 10^{-3}$	$\overline{v}_1 \omega$ $(m^2 s^{-1}) \times 10^{-3}$	$\Sigma \overline{v}_1 \omega \Delta x_2]_{II}$ $(m^3 s^{-1}) \times 10^{-3}$	$\Delta \Sigma \overline{v}_1 \omega \Delta x_2$ $(m^3 s^{-1}) \times 10^{-3}$	$\overline{\omega}$ $(m) \times 10^{-3}$	$\overline{\omega} L$ $(m^2) \times 10^{7}$	$\overline{v}_2$ $(ms^{-1}) \times 10^{5}$	$\overline{v}_{2*}$ $(ms^{-1}) \times 10^{5}$
0.0		0.00		0.00	0.00	3.74	4.89	0.00	0.00
	0.401		0.766						
0.5		0.401		0.766	-0.365	3.74	4.89	-0.38	-0.48
	0.327		0.607						
1.0		0.728		1.373	-0.645	3.74	4.89	-0.66	-0.80
	0.242		0.422						
1.5		0.970		1.795	-0.825	3.74	4.89	-0.85	-0.93
	0.159		0.244						
2.0		1.129		2.039	-0.910	3.37	4.43	-1.03	-0.10
	0.093		0.070						
2.5		1.222		2.004	-0.782	2.95	3.88	-1.01	-1.01
	0.027		-0.035						
3.0		1.249		1.969	-0.720	2.70	3.55	-1.01	-0.97
	-0.031		-0.137						
3.5		1.218		1.832	-0.614	2.52	3.31	-0.93	-0.86
	-0.076		-0.204						
4.0		1.142		1.628	-0.486	2.33	3.06	-0.79	-0.69
	-0.097		-0.296						
4.5		1.045		1.332	-0.287	2.15	2.83	-0.51	-0.39
	-0.113		-0.306						
5.0		0.932		1.026	-0.094	1.99	2.62	-0.18	-0.03
	-0.126		-0.272						
5.5		0.806		0.754	0.052	1.88	2.47	0.11	0.33
	-0.140		-0.236						
6.0		0.666		0.518	0.148	1.75	2.30	0.32	0.52
	-0.145		-0.201						
6.5		0.521		0.317	0.204	1.57	2.06	0.50	0.68
	-0.138		-0.163						
7.0		0.383		0.154	0.229	1.27	1.67	0.69	0.81
	-0.123		-0.118						
7.5		0.260		-0.036	0.150	0.83	1.09	0.57	0.75

Table V
Segment 24-11 (18-23 June)

Depth (m)	$\overline{\sigma_1\omega}$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\overline{\sigma_1\omega}\Delta x_2]_{24}$ $(m^3s^{-1})\times10^{-3}$	$\sigma_1\omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\sigma_1\omega\Delta x_2]_{11}$ $(m^3s^{-1})\times10^{-3}$	$\Delta\Sigma\sigma_1\omega\Delta x_2$ $(m^3s^{-1})\times10^{-3}$	$\overline{\omega}$ $(m)\times10^{-3}$	$\overline{\omega}L$ $(m^2)\times10^{-7}$	$\overline{\sigma}_2$ $(ms^{-1})\times10^{-5}$
0.0		0.00		0.00	0.00	3.88	9.05	0.00
	0.600		0.692					
0.5		0.600		0.692	-0.092	3.88	9.05	-0.05
	0.261		0.503					
1.0		0.861		1.195	-0.334	3.88	9.05	-0.18
	0.069		0.344					
1.5		0.930		1.539	-0.609	3.51	8.19	-0.37
	-0.030		0.206					
2.0		0.000		1.745	-0.845	2.91	6.79	-0.62
	-0.061		0.060					
2.5		0.839		1.805	-0.966	2.42	5.65	-0.85
	-0.075		-0.041					
3.0		0.764		1.764	-1.000	2.21	5.16	-0.97
	-0.081		-0.134					
3.5		0.683		1.630	-0.947	2.04	4.76	-0.99
	-0.085		-0.213					
4.0		0.598		1.417	-0.819	1.88	4.39	-0.93
	-0.081		-0.260					
4.5		0.517		1.157	-0.640	1.73	4.04	-0.79
	-0.074		-0.260					
5.0		0.443		0.897	-0.454	1.62	3.78	-0.60
	-0.067		-0.229					
5.5		0.376		0.668	-0.292	1.45	3.38	-0.43
	-0.049		-0.180					
6.0		0.327		0.488	-0.161	1.27	2.96	-0.27
	-0.042		-0.135					
6.5		0.285		0.353	-0.068	1.10	2.57	-0.13
	-0.037		-0.104					
7.0		0.248		0.249	-0.001	0.82	1.91	-0.02
	-0.029		-0.079					
7.5		0.219		0.170	0.013	0.50	1.16	0.11

Table V
Segment 24-11 (26 June-7 July)

Depth (m)	$\bar{\sigma}_1\omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\bar{\sigma}_1\omega\Delta x_2]_{24}$ $(m^3s^{-1})\times10^{-3}$	$\bar{\sigma}_1 u$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\bar{\sigma}_1\omega\Delta x_2]_{11}$ $(m^3s^{-1})\times10^{-3}$	$\Delta\Sigma\bar{\sigma}_1\omega\Delta x_2$ $(m^3s^{-1})\times10^{-3}$	$\bar{\omega}$ $(m)\times10^{-3}$	$\bar{\omega}L$ $(m^2)\times10^{-7}$	$\bar{\sigma}_2$ $(ms^{-1})\times10^{-5}$
0.0		0.00		0.00	0.00	3.63	8.36	0.00
	0.538		0.686					
0.5		0.538		0.686	-0.148	3.63	8.36	-0.009
	0.292		0.549					
1.0		0.830		1.235	-0.405	3.63	8.36	-0.024
	0.084		0.412					
1.5		0.914		1.647	-0.733	3.44	8.01	-0.44
	-0.039		0.262					
2.0		0.875		1.909	-1.034	2.91	6.79	-0.76
	-0.079		0.063					
2.5		0.796		1.830	-1.034	2.42	5.65	-0.92
	-0.079		-0.079					
3.0		0.717		1.666	-0.949	2.21	5.16	-0.92
	-0.072		-0.164					
3.5		0.645		1.502	-0.857	2.04	4.76	-0.90
	-0.069		-0.204					
4.0		0.576		1.298	-0.722	1.88	4.39	-0.82
	-0.062		-0.222					
4.5		0.514		1.076	-0.562	1.73	4.04	-0.70
	-0.061		-0.236					
5.0		0.453		0.840	-0.387	1.62	3.78	-0.51
	-0.071		-0.238					
5.5		0.382		0.602	-0.220	1.45	3.38	-0.33
	-0.062		-0.234					
6.0		0.320		0.368	-0.048	1.27	2.96	-0.08
	-0.058		-0.212					
6.5		0.262		0.156	0.106	1.10	2.57	0.21
	-0.053		-0.176					
7.0		0.209		-0.020	0.189	0.82	1.91	0.50
	-0.043		-0.152					
7.5		0.166		- .172	0.169	0.50	1.16	0.73

Table V
Segment 24-11 (17-21 July)

Depth (m)	$\bar{v}_1\omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\bar{v}_1\omega\Delta x_2]_{24}$ $(m^3s^{-1})\times10^{-3}$	$\bar{v}_1\omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\bar{v}_1\omega\Delta x_2]_{11}$ $(m^3s^{-1})\times10^{-3}$	$\Delta\Sigma\bar{v}_1\omega\Delta x_2$ $(m^3s^{-1})\times10^{-3}$	$\bar{\omega}$ $(m)\times10^{-3}$	$\bar{\omega}L$ $(m^2)\times10^{-7}$	$\bar{v}_2$ $(m\,s^{-1})\times10^{-5}$
0.0		0.00		0.00	0.00	4.01	9.34	0.00
	0.664		0.766					
0.5		0.664		0.766	-0.102	4.01	9.34	-0.05
	0.363		0.607					
1.0		1.027		1.373	-0.346	4.01	9.34	-0.18
	0.104		0.422					
1.5		1.131		1.795	-0.664	3.57	8.32	-0.40
	-0.039		0.244					
2.0		1.092		2.039	-0.947	2.91	6.79	-0.70
	-0.083		0.070					
2.5		1.009		2.004	-0.995	2.42	5.65	-0.88
	-0.092		-0.035					
3.0		0.917		1.969	-1.052	2.21	5.16	-1.02
	-0.095		-0.037					
3.5		0.822		1.832	-1.010	2.04	4.76	-0.16
	-0.103		-0.204					
4.0		0.719		1.628	-0.909	1.88	4.39	-1.04
	-0.099		-0.296					
4.5		0.620		1.332	-0.712	1.73	4.04	-0.88
	-0.095		-0.306					
5.0		0.525		1.026	-0.501	1.62	3.78	-0.66
	-0.089		-0.272					
5.5		0.436		0.754	-0.318	1.45	3.38	-0.47
	-0.066		-0.236					
6.0		0.370		0.518	-0.418	1.27	2.96	-0.25
	-0.058		-0.201					
6.5		0.312		0.317	-0.005	1.10	2.57	-0.01
	-0.052		-0.163					
7.0		0.260		0.154	0.106	0.82	1.91	0.22
	-0.033		-0.118					
7.5		0.227		-0.036	0.132	0.50	1.16	0.61

Table V
Segment 24-17 (18-23 June)

Depth (m)	$\bar{u}_1 \omega$ $(m^2s^{-1}) \times 10^{-3}$	$\Sigma \bar{u}_1 \omega \Delta x_2]_{24}$ $(m^3s^{-1}) \times 10^{-3}$	$\bar{u}_1 \omega$ $(m^2s^{-1}) \times 10^{-3}$	$\Sigma \bar{u}_1 \omega \Delta x_2]_{17}$ $(m^3s^{-1}) \times 10^{-3}$	$\Delta \Sigma \bar{u}_1 \omega \Delta x_2$ $(m^3s^{-1}) \times 10^{-3}$	$\bar{\omega}$ $(m) \times 10^{-3}$	$\bar{\omega} L$ $(m^2) \times 10^{-7}$	$\bar{u}_2$ $(ms^{-1}) \times 10^{5}$	$\bar{u}_2$* $(ms^{-1}) \times 10^{5}$
0.0		0.00		0.00	0.00	3.25	3.31	0.00	0.00
	0.600		0.351						
0.5		0.600		0.351	0.249	3.25	3.31	0.38	0.56
	0.261		0.288						
1.0		0.861		0.639	0.222	3.25	3.31	0.34	0.53
	0.069		0.224						
1.5		0.930		0.863	0.067	2.87	2.92	0.11	0.36
	-0.030		0.155						
2.0		0.900		1.018	-0.118	2.57	2.62	-0.23	-0.09
	-0.061		0.096						
2.5		0.839		1.114	-0.275	2.16	2.20	-0.63	-0.49
	-0.075		0.025						
3.0		0.764		1.139	-0.375	1.83	1.86	-0.01	-1.02
	-0.081		-0.034						
3.5		0.683		1.105	-0.422	1.68	1.71	-1.23	-1.39
	-0.085		-0.084						
4.0		0.598		1.021	-0.423	1.58	1.64	-1.29	-1.50
	-0.081		-0.117						
4.5		0.517		0.904	-0.387	1.38	1.40	-1.38	-1.73
	-0.074		-0.121						
5.0		0.443		0.183	-0.340	1.26	1.30	-1.31	-1.67
	-0.067		-0.113						
5.5		0.376		0.670	-0.294	1.14	1.16	-1.27	-1.62
	-0.049		-0.109						
6.0		0.327		0.561	-0.234	1.04	1.06	-1.10	-1.44
	-0.042		-0.105						
6.5		0.285		0.455	-0.174	0.98	1.00	-0.87	-1.19
	-0.037		-0.106						
7.0		0.248		0.349	-0.101	0.90	0.92	-0.54	-0.80
	-0.029		-0.102						
7.5		0.219		0.247	-0.014	0.74	0.75	-0.09	-0.29

* $\bar{u}_2$ --extrapolated to J-24

Table V
Segment 24-17 (26 June-7 July)

Depth (m)	$\bar{\upsilon}_1\omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\bar{\upsilon}_1\omega\Delta x_2]_{24}$ $(m^3s^{-1})\times10^{-3}$	$\bar{\upsilon}_1\omega$ $(m^2s^{-1})\times10^{-3}$	$\Sigma\bar{\upsilon}_1\omega\Delta x_2]_{17}$ $(m^3s^{-1})\times10^{-3}$	$\Delta\Sigma\bar{\upsilon}_1\omega\Delta x_2$ $(m^3s^{-1})\times10^{-3}$	ϖ $(m)\times10^{-3}$	ϖL $(m^2)\times10^{-7}$	$\bar{\upsilon}_2$ $(ms^{-1})\times10^{3}$	$\bar{\upsilon}_2$ * $(ms^{-1})\times10^{5}$
0.0		0.00		0.00	0.00	3.21	3.27	0.00	0.00
	0.538		0.401						
0.5		0.538		0.401	0.137	3.21	3.27	0.21	0.44
	0.292		0.334						
1.0		0.830		0.735	0.095	3.21	3.27	0.14	0.33
	0.084		0.265						
1.5		0.914		1.000	-0.086	2.96	3.01	0.14	-0.01
	0.039		0.187						
2.0		0.875		1.189	-0.314	2.57	2.62	-0.60	-0.47
	-0.079		0.105						
2.5		0.796		1.294	-0.498	2.16	2.20	-1.13	-1.22
	-0.079		0.022						
3.0		0.717		1.316	-0.599	1.83	1.86	-1.61	-1.88
	-0.072		-0.034						
3.5		0.645		1.282	-0.637	1.68	1.71	-1.86	-2.14
	-0.069		-0.074						
4.0		0.576		1.208	-0.632	1.58	1.64	-1.93	-2.22
	-0.062		-0.097						
4.5		0.514		1.111	-0.597	1.38	1.40	-2.13	-2.49
	-0.061		-0.120						
5.0		0.453		0.991	-0.538	1.26	1.30	-2.07	-2.46
	-0.071		-0.146						
5.5		0.382		0.845	-0.463	1.14	1.16	-1.99	-2.40
	-0.062		-0.170						
6.0		0.320		0.675	-0.355	1.04	1.06	-1.68	-2.09
	-0.058		-0.174						
6.5		0.263		0.501	-0.239	0.93	1.00	-1.20	-1.49
	-0.053		-0.160						
7.0		0.209		0.341	-0.132	0.90	0.92	-0.72	-1.07
	-0.043		-0.132						
7.5		0.166		0.209	-0.011	0.74	0.75	-0.14	-0.39

Table V
Segment 24-17 (17-21 July)

Depth (m)	$\overline{v}_1 w$ $(m^2s^{-1}) \times 10^{-3}$	$[\Sigma \overline{v}_1 w \Delta x_2]_{24}$ $(m^3s^{-1}) \times 10^{-3}$	$\overline{v}_1 w$ $(m^2s^{-1}) \times 10^{-3}$	$[\Sigma \overline{v}_1 w \Delta x_2]_{17}$ $(m^3s^{-1}) \times 10^{-3}$	$\Delta \Sigma \overline{v}_1 w \Delta x_2$ $(m^3s^{-1}) \times 10^{-3}$	$\overline{\omega}$ $(m) \times 10^{-3}$	$\overline{\omega} L$ $(m^2) \times 10^{-7}$	$\overline{v}_2$ $(m s^{-1}) \times 10^{5}$	$\overline{v}_{2*}$ $(m s^{-1}) \times 10^{5}$
0.0		0.00		0.00	0.00	3.32	3.38	0.00	0.00
	0.664		0.401						
0.5		0.664		0.401	0.263	3.32	3.38	0.40	0.67
	0.363		0.327						
1.0		1.027		0.728	0.299	3.32	3.38	0.45	0.73
	0.104		0.242						
1.5		1.131		0.970	0.161	2.88	2.93	0.28	0.58
	-0.039		0.159						
2.0		1.092		1.129	-0.037	2.57	2.62	-0.07	0.22
	-0.083		0.093						
2.5		1.009		1.222	-0.213	2.16	2.20	-0.49	-0.28
	-0.092		0.027						
3.0		0.917		1.249	-0.332	1.83	1.86	-0.89	-0.72
	-0.095		-0.031						
3.5		0.822		1.218	-0.396	1.68	1.71	-1.16	-1.23
	-0.103		-0.076						
4.0		0.719		1.142	-0.423	1.58	1.64	-1.29	-1.41
	-0.099		-0.097						
4.5		0.620		1.045	-0.425	1.38	1.40	-1.52	-1.83
	-0.095		-0.113						
0		0.525		0.932	-0.407	1.26	1.30	-1.56	-1.89
	-0.089		-0.126						
5.5		0.436		0.806	-0.370	1.14	1.16	-1.59	-1.96
	-0.066		-0.140						
6.0		0.370		0.666	-0.296	1.04	1.06	-1.40	-1.73
	-0.058		-0.145						
6.5		0.312		0.521	-0.209	0.98	1.00	-1.05	-1.37
	-0.052		-0.138						
7.0		0.260		0.383	-0.123	0.90	0.92	-0.66	-1.03
	-0.033		-0.123						
7.5		0.227		0.260	-0.008	0.74	0.75	-0.12	-0.38

Table VI
J-11 (18-23 June)

Depth (m)	Width (m) $\times 10^{-3}$	$\partial \bar{v}_1 w / \partial x_1$ $(m s^{-1}) \times 10$	$\Sigma \, \partial \bar{v}_1 w / \partial x_1 \, \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{v}_2$[1] $(m s^{-1}) \times 10^4$
0.0	4.30		0.00	0.00
		0.489		
0.5	4.30		0.489	-0.057
		0.268		
1.0	4.30		0.757	-0.088
		0.155		
1.5	4.30		0.912	-0.106
		-0.027		
2.0	3.71		0.884	-0.120
		-0.142		
2.5	3.21		0.742	-0.116
		-0.122		
3.0	3.06		0.571	-0.093
		-0.171		
3.5	2.88		0.399	-0.069
		-0.180		
4.0	2.64		0.173	-0.033
		-0.266		
4.5	2.49		0.002	-0.004
		-0.171		
5.0	2.35		-0.128	0.027
		-0.140		
5.5	2.19		-0.223	0.051
		-0.094		
6.0	1.98		-0.231	0.058
		-0.009		
6.5	1.69		-0.212	0.059
		0.019		
7.0	1.19		-0.176	0.072
		0.037		
7.5	0.59		-0.154	0.085

1 In Table VI $\bar{v}_2$ is given in meters per second times 10^4. All other tables give it in meters per second times 10^5.

Table VI
J-11 (26 June-7 July)

Depth (m)	Width (m) $\times 10^{-3}$	$\partial \bar{v}_1 \omega / \partial x_1$ $(ms^{-1}) \times 10$	$\sum \frac{\partial \bar{v}_1 \omega}{\partial x_1} \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{v}_2$ $(ms^{-1}) \times 10^4$
0.0	4.16		0.00	0.00
		0.368		
0.5	4.16		0.368	-0.044
		0.222		
1.0	4.16		0.590	-0.071
		0.091		
1.5	4.16		0.681	-0.081
		0.004		
2.0	3.71		0.677	-0.091
		-0.079		
2.5	3.21		0.566	-0.088
		-0.111		
3.0	3.06		0.438	-0.072
		-0.128		
3.5	2.88		0.305	-0.053
		-0.133		
4.0	2.64		0.172	-0.032
		-0.027		
4.5	2.49		0.045	-0.009
		-0.113		
5.0	2.35		-0.068	0.014
		-0.092		
5.5	2.19		-0.160	0.037
		-0.061		
6.0	1.98		-0.221	0.056
		-0.009		
6.5	1.69		-0.214	0.063
		0.007		
7.0	1.19		-0.207	0.087
		-0.004		
7.5	0.59		-0.211	0.178

Table VI
J-11 (17-21 July)

Depth (m)	Width (m) x 10^{-3}	$\partial \bar{u}_1 w / \partial x_1$ $(m\ s^{-1})$ x 10	$\sum \frac{\partial \bar{u}_1 w}{\partial x_1} \Delta x_2$ $(m^2 s^{-1})$ x 10^{-3}	$\bar{u}_2$ $(m s^{-1})$ x 10^4
0.0	4.43		0.00	0.00
		0.389		
0.5	4.43		0.389	-0.046
		0.260		
1.0	4.43		0.649	-0.066
		0.132		
1.5	4.43		0.781	-0.093
		0.031		
2.0	3.71		0.812	-0.109
		-0.037		
2.5	3.21		0.775	-0.121
		-0.084		
3.0	3.06		0.691	-0.114
		-0.123		
3.5	2.88		0.568	-0.099
		-0.156		
4.0	2.64		0.412	-0.077
		-0.172		
4.5	2.49		0.240	-0.048
		-0.159		
5.0	2.35		0.081	-0.017
		-0.119		
5.5	2.19		-0.038	0.009
		-0.070		
6.0	1.98		-0.108	0.027
		-0.015		
6.5	1.69		-0.123	0.036
		0.006		
7.0	1.19		-0.117	0.049
		0.030		
7.5	0.59		-0.087	0.074

Table VI
J-17 (18-23 June)

Depth (m)	Width (m) $\times 10^{-3}$	$\partial \bar{u}_1 \omega / \partial x_1$ $(ms^{-1}) \times 10$	$\sum \frac{\partial \bar{u}_1 \omega}{\partial x_1} \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{U}_2$ $(ms^{-1}) \times 10^4$
0.0	3.03		0.00	0.00
		0.027		
0.5	3.03		0.027	-0.004
		0.071		
1.0	3.03		0.098	-0.016
		0.071		
1.5	3.03		0.169	-0.028
		0.086		
2.0	3.02		0.255	-0.042
		0.065		
2.5	2.69		0.320	-0.060
		0.036		
3.0	2.34		0.356	-0.076
		-0.035		
3.5	2.17		0.321	-0.074
		-0.039		
4.0	2.02		0.281	-0.069
		-0.044		
4.5	1.80		0.238	-0.066
		-0.062		
5.0	1.63		0.175	-0.054
		-0.093		
5.5	1.57		0.083	-0.037
		-0.040		
6.0	1.53		0.043	-0.021
		-0.041		
6.5	1.44		0.002	-0.006
		-0.040		
7.0	1.34		-0.037	0.014
		-0.036		
7.5	1.06		-0.043	0.020

Table VI
J-17 (26 June-7 July)

Depth (m)	Width (m) $\times 10^{-3}$	$\partial \bar{u}_{1\omega} / \partial x_1$ $(ms^{-1}) \times 10$	$\sum \frac{\partial \bar{u}_{1\omega}}{\partial x_1} \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{u}_2$ $(ms^{-1}) \times 10^4$
0.0	3.31		0.00	0.00
		0.009		
0.5	3.31		0.009	-0.001
		0.075		
1.0	3.31		0.084	-0.013
		0.168		
1.5	3.31		0.252	-0.040
		0.160		
2.0	3.02		0.412	-0.068
		0.066		
2.5	2.69		0.478	-0.089
		0.009		
3.0	2.34		0.487	-0.092
		-0.016		
3.5	2.17		0.471	-0.109
		-0.035		
4.0	2.02		0.436	-0.108
		-0.052		
4.5	1.80		0.384	-0.107
		-0.065		
5.0	1.63		0.319	-0.098
		-0.074		
5.5	1.57		0.245	-0.078
		-0.078		
6.0	1.53		0.167	-0.055
		-0.073		
6.5	1.44		0.094	-0.033
		-0.056		
7.0	1.34		0.038	-0.014
		-0.047		
7.5	1.06		-0.009	0.004

Table VI
J-17 (17-21 July)

Depth (m)	Width (m) $\times 10^{-3}$	$\partial \bar{u}_1 w / \partial x_2$ $(ms^{-1}) \times 10$	$\Sigma \frac{\partial \bar{u}_1 w}{\partial x_2} \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{v}_2$ $(ms^{-1}) \times 10^4$
0.0	3.06		0.00	0.00
		0.007		
0.5	3.06		0.007	-0.001
		0.059		
1.0	3.06		0.066	-0.011
		0.102		
1.5	3.06		0.168	-0.028
		0.114		
2.0	3.02		0.282	-0.047
		0.079		
2.5	2.69		0.361	-0.067
		0.037		
3.0	2.34		0.398	-0.085
		-0.002		
3.5	2.17		0.396	-0.091
		-0.037		
4.0	2.02		0.359	-0.089
		-0.066		
4.5	1.80		0 293	-0.081
		-0.088		
5.0	1.63		0.205	-0.063
		-0.090		
5.5	1.57		0.115	-0.037
		-0.078		
6.0	1.53		0.037	-0.012
		-0.077		
6.5	1.44		-0.040	0.014
		-0.067		
7.0	1.34		-0.107	0.040
		-0.065		
7.5	1.06		-0.172	0.081

Table VI
J-24 (18-23 June)

Depth (m)	Width (m) x10^{-3}	$\partial \sigma \bar{u} w / \partial x_1$ (m s^{-1}) x10	$\sum \frac{\partial \sigma \bar{u} w}{\partial x_1} \Delta x_2$ (m^2 s^{-1}) x10^{-3}	$\bar{\sigma}_2$ (m s^{-1}) x10^4
0.0	3.47		0.00	0.00
		-0.437		
0.5	3.47		-0.437	0.063
		0.025		
1.0	3.47		-0.412	0.059
		0.251		
1.5	2.71		-0.161	0.029
		0.272		
2.0	2.12		0.111	-0.026
		0.195		
2.5	1.62		0.306	-0.095
		0.132		
3.0	1.32		0.438	-0.166
		0.072		
3.5	1.20		0.510	-0.212
		0.007		
4.0	1.13		0.517	-0.229
		-0.057		
4.5	0.96		0.460	-0.240
		-0.012		
5.0	0.90		0.448	-0.249
		-0.098		
5.5	0.71		0.350	-0.246
		-0.109		
6.0	0.55		0.241	-0.220
		-0.045		
6.5	0.51		0.196	-0.192
		-0.026		
7.0	0.46		0.170	-0.155
		-0.11		
7.5	0.41		0.152	-0.115

Table VI
J-24 (26 June-7 July)

Depth (m)	Width (m) $\times 10^{-3}$	$\partial \bar{u}_i w / \partial x_2$ $(m s^{-1}) \times 10$	$\Sigma \frac{\partial \bar{u}_i w}{\partial x_1} \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{u}_2$ $(m s^{-1}) \times 10^4$
0.0	3.11		0.00	0.00
		-0.231		
0.5	3.11		-0.23	0.037
		0.001		
1.0	3.11		-0.230	0.037
		0.124		
1.5	2.71		-0.106	0.022
		0.210		
2.0	2.12		0.105	0.019
		0.192		
2.5	1.62		0.298	-0.092
		0.162		
3.0	1.32		0.470	-0.178
		0.055		
3.5	1.20		0.525	-0.219
		-0.014		
4.0	1.13		0.511	-0.226
		-0.074		
4.5	0.96		0.437	-0.228
		-0.028		
5.0	0.90		0.409	-0.227
		-0.087		
5.5	0.71		0.322	-0.227
		-0.084		
6.0	0.55		0.238	-0.216
		-0.075		
6.5	0.51		0.163	-0.158
		-0.058		
7.0	0.41		0.105	-0.114
		-.059		
7.5	0.41		0.046	-0.056

Table VI
J-24 (17-21 July)

Depth (m)	Width (m) $\times 10^{-3}$	$\partial \bar{u}_1 \omega / \partial x_1$ $(ms^{-1}) \times 10$	$\Sigma \frac{\partial \bar{u}_1 \omega}{\partial x_1} \Delta x_2$ $(m^2 s^{-1}) \times 10^{-3}$	$\bar{u}_2$ $(ms^{-1}) \times 10^4$
0.0	3.59		0.00	0.00
		-0.423		
0.5	3.59		-0.423	0.060
		-0.103		
1.0	3.59		-0.526	0.077
		0.140		
1.5	2.71		-0.386	0.054
		0.222		
2.0	2.12		-0.164	0.039
		0.224		
2.5	1.62		0.060	-0.019
		0.162		
3.0	1.32		0.222	-0.084
		0.097		
3.5	1.20		0.319	-0.133
		0.061		
4.0	1.13		0.356	-0.157
		0.010		
4.5	0.96		0.364	-0.190
		0.000		
5.0	0.90		0.364	-0.202
		0.059		
5.5	0.71		0.305	-0.214
		0.091		
6.0	0.55		0.214	-0.194
		0.089		
6.5	0.51		0.125	-0.123
		0.061		
7.0	0.41		0.064	-0.070
		0.061		
7.5	0.41		0.043	-0.026

Table VII
Station J-11

Depth (m)	18-23 June			26 June-7 July			17-21 July		
	$[\bar{v}_2]_A$ $(ms^{-1})\times10^5$	$[\bar{v}_2]_B$ $(ms^{-1})\times10^5$	$\bar{v}_2$ $(ms^{-1})\times10^5$	$[\bar{v}_2]_A$ $(ms^{-1})\times10^5$	$[\bar{v}_2]_B$ $(ms^{-1})\times10^5$	$\bar{v}_2$ $(ms^{-1})\times10^5$	$[\bar{v}_2]_A$ $(ms^{-1})\times10^5$	$[\bar{v}_2]_B$ $(ms^{-1})\times10^5$	$\bar{v}_2$ $(ms^{-1})\times10^5$
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.5	-0.42	-0.57	-0.50	-0.36	-0.44	-0.39	-0.48	-0.45	-0.46
1.0	-0.64	-0.88	-0.71	-0.56	-0.71	-0.63	-0.80	-0.66	-0.73
1.5	-0.75	-1.06	-0.90	-0.69	-0.81	-0.74	-0.93	-0.93	-0.93
2.0	-0.81	-1.20	-1.00	-0.82	-0.91	-0.86	-1.10	-1.09	-1.09
2.5	-0.86	-1.16	-1.01	-0.62	-0.88	-0.74	-1.01	-1.21	-1.11
3.0	-0.80	-0.93	-0.87	-0.39	-0.72	0.55	-0.97	-1.14	-1.06
3.5	-0.74	-0.69	-0.71	-0.21	-0.53	-0.37	-0.86	-0.99	-0.92
4.0	-0.57	0.33	-0.45	-0.02	-0.32	-0.17	-0.69	-0.77	-0.73
4.5	-0.35	-0.04	-0.20	+0.18	-0.09	+0.04	-0.39	-0.48	-0.44
5.0	-0.10	+0.27	+0.08	0.45	+0.14	0.29	-0.03	-0.17	-0.10
5.5	+0.10	0.51	0.31	0.69	0.37	0.53	+0.33	+0.09	+0.21
6.0	0.27	0.58	0.42	0.88	0.56	0.72	0.52	0.27	0.39
6.5	0.34	0.59	0.47	1.00	0.63	0.82	0.68	0.36	0.52
7.0	0.39	0.72	0.55	1.17	0.87	1.02	0.81	0.49	0.65

Table VII
Station J-17

Depth (m)	18-23 June			26 June-7 July			17-21 July		
	$\overline{U}_2]_A$ $(ms^{-1})\times10^5$	$\overline{U}_2]_B$ $(ms^{-1})\times10^5$	$\overline{U}_2$ $(ms^{-1})\times10^5$	$\overline{U}_2]_A$ $(ms^{-1})\times10^5$	$\overline{U}_2]_B$ $(ms^{-1})\times10^5$	$\overline{U}_2$ $(ms^{-1})\times10^5$	$\overline{U}_2]_A$ $(ms^{-1})\times10^5$	$\overline{U}_2]_B$ $(ms^{-1})\times10^5$	$\overline{U}_2$ $(ms^{-1})\times10^5$
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.5	-0.05	-0.04	-0.05	-0.09	-0.01	-0.04	-0.05	-0.01	-0.03
1.0	-0.18	-0.16	-0.17	-0.24	-0.13	-0.18	-0.18	-0.11	-0.15
1.5	-0.37	-0.28	-0.32	-0.44	-0.40	-0.42	-0.40	-0.28	-0.34
2.0	-0.62	-0.42	-0.52	-0.76	-0.68	-0.72	-0.70	-0.47	-0.58
2.5	-0.85	-0.60	-0.73	-0.92	-0.89	-0.90	-0.88	-0.67	-0.78
3.0	-0.97	-0.76	-0.86	-0.92	-0.92	-0.92	-1.02	-0.85	-0.92
3.5	-0.99	-0.74	-0.87	-0.90	-1.09	-1.00	-1.06	-0.91	-0.99
4.0	-0.93	-0.69	-0.81	-0.82	-1.08	-0.95	-1.04	-0.89	-0.96
4.5	-0.79	-0.66	-0.72	-0.70	-1.07	-0.89	-0.88	-0.81	-0.85
5.0	-0.60	-0.54	-0.57	-0.51	-0.98	-0.74	-0.66	-0.63	-0.64
5.5	-0.43	-0.37	-0.40	-0.33	-0.78	-0.56	-0.47	-0.37	-0.42
6.0	-0.27	-0.21	-0.24	-0.08	-0.55	-0.32	-0.25	-0.12	-0.19
6.5	-0.13	-0.06	-0.10	+0.21	-0.33	-0.06	-0.01	+0.14	+0.06
7.0	-0.02	+0.14	+0.06	0.50	-0.14	0.18	+0.22	0.40	0.31
7.5	+0.11	0.020	0.15	0.73	+0.04	0.43	0.61	0.81	0.71

Table VII
Station J-24

Depth (m)	18-23 June $\bar{U}_2]_A$ $(ms^{-1})\times10^5$	18-23 June $\bar{U}_2]_B$ $(ms^{-1})\times10^5$	18-23 June $\bar{U}_2$ $(ms^{-1})\times10^5$	26 June-7 July $\bar{U}_2]_A$ $(ms^{-1})\times10^5$	26 June-7 July $\bar{U}_2]_B$ $(ms^{-1})\times10^5$	26 June-7 July $\bar{U}_2$ $(ms^{-1})\times10^5$	17-21 July $\bar{U}_2]_A$ $(ms^{-1})\times10^5$	17-21 July $\bar{U}_2]_B$ $(ms^{-1})\times10^5$	17-21 July $\bar{U}_2$ $(ms^{-1})\times10^5$
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.5	0.56	0.63	0.60	0.44	0.37	0.40	0.67	0.60	0.64
1.0	0.53	0.59	0.57	0.33	0.36	0.34	0.73	0.77	0.75
1.5	0.36	0.29	0.33	-0.01	0.22	0.10	0.58	0.54	0.56
2.0	-0.09	-0.26	-0.17	-0.47	-0.19	-0.33	0.22	0.39	0.31
2.5	-0.49	-0.95	-0.72	-1.22	-0.92	-1.07	-0.28	-0.19	-0.23
3.0	-1.02	-1.66	-1.34	-1.88	-1.78	-1.83	-0.72	-0.84	-0.78
3.5	-1.39	-2.12	-1.75	-2.14	-2.19	-2.16	-1.23	-1.33	-1.28
4.0	-1.50	-2.29	-1.90	-2.22	-2.26	-2.24	-1.41	-1.57	-1.49
4.5	-1.73	-2.40	-2.06	-2.49	-2.28	-2.38	-1.83	-1.90	-1.87
5.0	-1.67	-2.49	-2.08	-2.46	-2.27	-2.37	-1.89	-2.02	-1.95
5.5	-1.62	-2.46	-2.04	-2.40	-2.27	-2.33	-1.96	-2.14	-2.05
6.0	-1.44	-2.20	-1.81	-2.09	-2.16	-2.12	-1.73	-1.94	-1.84
6.5	-1.19	-1.92	-1.56	-1.49	-1.58	-1.54	-1.37	-1.23	-1.30
7.0	-0.80	-1.55	-1.17	-1.07	-1.14	-1.10	-1.03	-0.70	-0.86

Table VIII
J-11 (18-23 June)

Depth (m)	$\bar{v}_1$ (ms^{-1})	$\partial\bar{s}/\partial x_1$ $(gm^{-4})\times 10$	$\bar{v}_1\,\partial\bar{s}/\partial x_1$ $(gm^{-3}s^{-1})\times 10$	$\bar{v}_2$ $(ms^{-1})\times 10^5$	$\partial\bar{s}/\partial x_2$ $(gm^{-4})\times 10^{-3}$	$\bar{v}_2\,\partial\bar{s}/\partial x_2$ $(gm^{-3}s^{-1})\times 10^2$
0.0	0.180	2.99	0.538	0.00	0.24	0.00
0.5	0.137	2.99	0.410	-0.50	0.13	-0.065
1.0	0.098	3.01	0.295	-0.71	0.17	-0.121
1.5	0.062	3.05	0.189	-0.90	0.32	-0.288
2.0	0.033	3.15	0.104	-1.00	0.53	-0.530
2.5	0.003	3.29	0.010	-0.01	0.90	-0.909
3.0	-0.028	3.39	-0.095	-0.87	1.24	-1.079
3.5	-0.061	3.24	-0.198	-0.71	1.03	-0.731
4.0	-0.093	2.97	-0.276	-0.45	0.55	-0.247
4.5	-0.110	2.78	-0.306	-0.20	0.32	-0.064
5.0	-0.107	2.68	-0.287	0.08	0.21	0.017
5.5	-0.095	2.61	-0.248	0.31	0.16	0.050
6.0	-0.078	2.54	-0.198	0.42	0.17	0.071
6.5	-0.071	2.49	-0.177	0.47	0.17	0.080
7.0	-0.070	2.45	-0.171	0.55	0.17	0.093

Table VIII
J-11 (26 June-7 July)

Depth (m)	$\bar{U}_1$ $(m s^{-1})$	$\partial \bar{s}/\partial x_1$ $(g m^{-4}) \times 10$	$\bar{U}_1 \partial \bar{s}/\partial x_1$ $(g m^{-3} s^{-1}) \times 10$	$\bar{U}_2$ $(m s^{-1}) \times 10^5$	$\partial \bar{s}/\partial x_2$ $(g m^{-4}) \times 10^{-3}$	$\bar{U}_2 \partial \bar{s}/\partial x_2$ $(g m^{-3} s^{-1}) \times 10^2$
0.0	0.180	2.71	0.488	0.00	0.15	0.00
0.5	0.149	2.79	0.416	-0.39	0.27	-0.105
1.0	0.116	2.88	0.334	-0.63	0.24	-0.151
1.5	0.882	2.97	0.244	-0.74	0.11	-0.081
2.0	0.043	3.10	0.133	-0.86	0.15	-0.129
2.5	-0.006	3.10	0.019	-0.74	0.35	-0.259
3.0	-0.044	2.92	-0.128	-0.55	0.87	-0.478
3.5	-0.066	2.74	-0.181	-0.37	0.93	-0.344
4.0	-0.082	2.62	-0.21.5	-0.17	0.58	-0.099
4.5	-0.093	2.54	-0.236	0.04	0.32	0.013
5.0	-0.102	2.51	-0.256	0.29	0.19	0.055
5.5	-0.109	2.50	-0.272	0.53	0.20	0.106
6.0	-0.114	2.49	-0.284	0.72	0.15	0.108
6.5	-0.118	2.49	-0.294	0.82	0.16	0.131
7.0	-0.120	2.49	-0.299	1.02	0.23	0.235

Table VIII
J-11 (17-21 July)

Depth (m)	$\bar{U}_1$ (ms^{-1})	$\partial\bar{s}/\partial x_1$ $(gm^{-4})\times 10$	$\bar{U}_1\,\partial\bar{s}/\partial x_1$ $(gm^{-3}s^{-1})\times 10$	$\bar{U}_2$ $(ms^{-1})\times 10^5$	$\partial\bar{s}/\partial x_2$ $(gm^{-4})\times 10^{-3}$	$\bar{U}_2\,\partial\bar{s}/\partial x_2$ $(gm^{-3}s^{-1})\times 10^2$
0.0	0.190	3.25	0.617	0.00	0.15	0.00
0.5	0.156	3.21	0.501	-0.46	0.14	-0.064
1.0	0.117	3.16	3.70	-0.73	0.13	-0.095
1.5	0.073	3.15	0.230	-0.93	0.16	-0.147
2.0	0.036	3.19	0.115	-1.09	0.38	-0.414
2.5	0.006	3.24	0.019	-1.11	0.77	-0.855
3.0	-0.027	3.25	-0.088	-1.06	1.19	-1.261
3.5	-0.065	3.13	-0.203	-0.92	0.98	-0.902
4.0	-0.103	2.63	-0.271	-0.73	0.42	-0.307
4.5	-0.129	2.54	-0.328	-0.44	0.24	-0.106
5.0	-0.125	2.51	-0.314	-0.10	0.18	-0.018
5.5	-0.115	2.50	-0.287	0.21	0.13	0.027
6.0	-0.110	2.49	-0.274	0.39	0.12	0.047
6.5	-0.110	2.49	-0.274	0.52	0.23	0.120
7.0	-0.110	2.49	-0.274	0.65	0.37	0.241

Table VIII
J-17 (18-23 June)

Depth (m)	$\bar{U}_1$ ($m s^{-1}$)	$\partial\bar{s}/\partial x_1$ ($g m^{-4}$) $\times 10$	$\bar{U}_1 \, \partial\bar{s}/\partial x_1$ ($g m^{-3} s^{-1}$) $\times 10$	$\bar{U}_2$ ($m s^{-1}$) $\times 10^5$	$\partial\bar{s}/\partial x_2$ ($g m^{-4}$) $\times 10^{-3}$	$\bar{U}_2 \, \partial\bar{s}/\partial x_2$ ($g m^{-3} s^{-1}$) $\times 10$
0.0	0.126	3.84	0.484	0.00	0.40	0.00
0.5	0.106	3.84	0.407	-0.05	0.20	-0.010
1.0	0.085	3.84	0.326	-0.17	0.08	-0.014
1.5	0.062	3.84	0.238	-0.32	0.06	-0.019
2.0	0.041	3.87	0.159	-0.52	0.08	-0.042
2.5	0.022	4.00	0.088	-0.73	0.30	-0.219
3.0	-0.002	4.20	-0.008	-0.86	1.36	-1.170
3.5	-0.028	4.20	-0.118	-0.87	1.78	-1.548
4.0	-0.053	4.13	-0.219	-0.81	1.00	-0.810
4.5	-0.069	4.04	-0.279	-0.72	0.47	-0.338
5.0	-0.072	4.00	-0.288	-0.57	0.24	-0.137
5.5	-0.070	3.97	-0.278	-0.40	0.23	-0.092
6.0	-0.070	3.97	-0.278	-0.24	0.28	-0.67
6.5	-0.072	3.97	-0.286	-0.10	0.52	-0.052
7.0	-0.080	3.97	-0.318	0.06	0.58	0.035
7.5	-0.087	3.97	0.345	0.02	0.63	0.013

Table VIII
J-17 (26 June-7 July)

Depth (m)	$\bar{U}_1$ ($m s^{-1}$)	$\partial\bar{s}/\partial x_1$ ($g m^{-4}$)x10	$\bar{U}_1\,\partial\bar{s}/\partial x_1$ ($g m^{-3} s^{-1}$)x10	$\bar{U}_2$ ($m s^{-1}$)x10^5	$\partial\bar{s}/\partial x_2$ ($g m^{-4}$)x10^3	$\bar{U}_2\,\partial\bar{s}/\partial x_2$ ($g m^{-3} s^{-1}$)x10^3
0.0	0.131	3.84	0.503	0.00	0.41	0.00
0.5	0.111	3.84	0.426	-0.04	0.26	-0.010
1.0	0.092	3.90	0.360	-0.18	0.08	-0.014
1.5	0.068	3.94	0.268	-0.43	0.07	-0.031
2.0	0.047	4.00	0.188	-0.72	0.29	-0.209
2.5	0.022	4.10	0.090	-0.90	0.54	-0.486
3.0	-0.004	4.13	-0.017	-0.92	0.70	-0.644
3.5	-0.026	4.07	-0.106	-1.00	0.99	-0.990
4.0	-0.044	3.97	-0.175	-0.95	0.88	-0.836
4.5	-0.058	3.90	-0.226	-0.89	0.35	-0.312
5.0	-0.082	3.87	-0.317	-0.74	0.11	-0.081
5.5	-0.102	3.87	-0.395	-0.56	0.19	-0.106
6.0	-0.116	3.84	-0.445	-0.32	0.35	-0.112
6.5	-0.118	3.84	-0.453	-0.06	0.39	-0.23
7.0	-0.112	3.84	-0.430	0.18	0.37	0.67
7.5	-0.102	3.84	-3.92	0.43	0.38	0.163

Table VIII
J-17 (17-21 July)

Depth (m)	$\bar{v}_1$ (ms^{-1})	$\partial\bar{S}/\partial x_1$ (gm^{-4})x10	$\bar{v}_1\,\partial\bar{S}/\partial x_1$ ($gm^{-3}s^{-1}$)x10	$\bar{v}_2$ (ms^{-1})x10^5	$\partial\bar{S}/\partial x_2$ (gm^{-4})x10^{-3}	$\bar{v}_2\,\partial\bar{S}/\partial x_2$ ($gm^{-3}s^{-1}$)x10^{8}
0.0	0.141	3.94	0.555	0.00	0.60	0.00
0.5	0.120	3.94	0.473	-0.03	0.32	-0.010
1.0	0.094	3.94	0.370	-0.15	0.10	-0.015
1.5	0.064	3.97	0.254	-0.35	0.06	-0.021
2.0	0.040	4.03	0.161	-0.58	0.19	-0.110
2.5	0.022	4.20	0.092	-0.78	0.37	-0.289
3.0	-0.001	4.30	-0.004	-0.92	1.24	-1.141
3.5	.027	4.23	-0.110	0.99	1.66	-1.643
4.0	-0.045	4.07	-0.183	-0.96	0.97	-0.931
4.5	0.058	3.94	-0.229	-0.85	0.46	-0.391
5.0	0.073	3.94	-0.288	-0.64	0.17	-0.109
5.5	-0.085	3.90	-0.331	-0.42	0.13	-0.55
6.0	-0.094	3.90	-0.367	-0.19	0.25	-0.048
6.5	-0.099	3.90	-0.386	+0.06	0.38	0.023
7.0	-0.100	3.90	-0.390	0.31	0.45	0.140
7.5	-0.100	3.70	-0.390	0.71	0.49	0.348

Table VIII
J-24 (18-23 June)

Depth (m)	$\bar{v}_1$ $(m\ s^{-1})$	$\partial\bar{s}/\partial x_1$ $(g\ m^{-4}) \times 10$	$\bar{v}_1\ \partial\bar{s}/\partial x_1$ $(g\ m^{-3} s^{-1}) \times 10$	$\bar{v}_2$ $(m\ s^{-1}) \times 10^{-5}$	$\partial\bar{s}/\partial x_2$ $(g\ m^{-4}) \times 10^{-3}$	$\bar{v}_2\ \partial\bar{s}/\partial x_2$ $(g\ m^{-3} s^{-1}) \times 10^{-7}$
0.0	0.220	4.59	0.010	0.00	0.07	0.00
0.5	0.120	4.59	0.551	0.60	0.03	0.018
1.0	0.042	4.59	0.193	0.57	0.02	0.011
1.5	0.002	4.63	0.009	0.33	0.02	0.007
2.0	-0.024	4.69	-0.113	-0.17	0.10	-0.017
2.5	-0.043	4.86	-0.209	-0.72	0.26	-0.187
3.0	-0.058	5.05	-0.293	-1.34	0.70	-0.938
3.5	-0.070	5.41	-0.379	-1.75	1.13	-1.978
4.0	-0.076	5.51	-0.419	-1.90	0.80	-1.520
4.5	-0.080	5.68	-0.454	-2.06	0.30	-0.618
5.0	-0.080	5.81	-0.465	-2.08	0.16	-0.333
5.5	-0.080	5.87	-0.470	-2.04	0.13	-0.265
6.0	-0.080	5.97	-0.478	-1.81	0.18	-0.326
6.5	-0.080	6.04	-0.483	-1.56	0.17	-0.265
7.0	-0.080	6.07	-0.486	-1.17	0.11	-0.129

Table VIII
J-24 (26 June-7 July)

Depth (m)	$\bar{U}_1$ (ms^{-1})	$\partial\bar{S}/\partial x_1$ (gm^{-4})x10	$\bar{U}_1\,\partial\bar{S}/\partial x_1$ ($gm^{-3}s^{-1}$)x10	$\bar{U}_2$ (ms^{-1})x10^{5}	$\partial\bar{S}/\partial x_2$ (gm^{-4})x10^{-3}	$\bar{U}_2\,\partial\bar{S}/\partial x_2$ ($gm^{-3}s^{-1}$)x10^{2}
0.0	0.211	4.89	1.032	0.00	0.04	0.00
0.5	0.134	4.89	0.656	0.40	0.03	0.012
1.0	0.054	4.92	0.266	0.34	0.02	0.007
1.5	0.001	4.95	0.005	0.10	0.02	0.002
2.0	-0.033	5.05	-0.167	-0.33	0.03	-0.010
2.5	-0.052	5.22	-0.271	-1.07	0.14	-0.150
3.0	-0.058	5.38	-0.312	-1.83	0.47	-0.860
3.5	-0.059	5.61	-0.331	-2.16	0.95	-2.052
4.0	-0.060	5.81	-0.349	-2.24	0.82	-1.837
4.5	-0.061	6.04	-0.368	-2.38	0.33	-0.785
5.0	-0.072	6.14	-0.442	-2.37	0.18	-0.427
5.5	-0.095	6.20	-0.589	-2.33	0.15	-0.349
6.0	-0.110	6.23	-0.685	-2.12	0.20	-0.424
6.5	-0.110	6.27	-0.690	-1.54	0.18	-0.277
7.0	-0.110	6.27	-0.690	-1.10	0.10	-0.110

Table VIII
J-24 (17-21 July)

Depth (m)	$\bar{v}_1$ ($m\,s^{-1}$)	$\partial\bar{s}/\partial x_1$ ($g\,m^{-4}$)$\times 10$	$\bar{v}_1\,\partial\bar{s}/\partial x_1$ ($g\,m^{-3}\,s^{-1}$)$\times 10$	$\bar{v}_2$ ($m\,s^{-1}$)$\times 10^{3}$	$\partial\bar{s}/\partial x_2$ ($g\,m^{-4}$)$\times 10^{-3}$	$\bar{v}_2\,\partial\bar{s}/\partial x_2$ ($g\,m^{-3}\,s^{-1}$)$\times 10^{2}$
0.0	0.235	4.40	1.034	0.00	0.11	0.00
0.5	0.145	4.40	0.638	0.64	0.06	0.038
1.0	0.057	4.43	0.253	0.75	0.02	0.015
1.5	0.001	4.46	0.005	0.56	0.03	0.017
2.0	-0.034	4.49	-0.153	0.31	0.04	0.012
2.5	-0.056	4.59	-0.257	-0.23	0.11	-0.025
3.0	-0.072	4.69	-0.338	-0.78	0.46	-0.359
3.5	-0.083	4.82	-0.400	-1.28	0.98	-1.254
4.0	-0.092	4.99	-0.459	-1.49	0.86	-1.281
4.5	-0.098	5.12	-0.502	-1.87	0.35	-0.654
5.0	-0.105	5.18	-0.544	-1.95	0.16	-0.312
5.5	-0.107	5.22	-0.558	-2.05	0.16	-0.328
6.0	-0.109	5.22	-0.569	-1.84	0.21	-0.386
6.5	-0.109	5.22	-0.569	-1.30	0.17	-0.221
7.0	-0.109	5.22	-0.569	-0.86	0.08	-0.069

Table IX
J-11 (18-23 June)

Depth (m)	$\partial\bar{s}/\partial t$ $(gm^{-3}s^{-1})\times10^4$	$\bar{u}_1\,\partial\bar{s}/\partial x_1$ $(gm^{-3}s^{-1})\times10^4$	$\bar{u}_2\,\partial\bar{s}/\partial x_2$ $(gm^{-3}s^{-1})\times10^4$	$\frac{1}{w}\frac{\partial w\langle u_1's'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1})\times10^4$	$\frac{1}{w}\frac{\partial w\langle u_2's'\rangle}{\partial x_2}$ $(gm^{-3}s^{-1})\times10^4$
0.0	-2.3	538.0	0.0	2.74	-538.4
0.5	-2.3	410.0	-6.5	2.74	-403.9
1.0	-2.4	295.0	-12.1	2.74	-283.2
1.5	-1.4	189.0	-28.8	2.75	-161.5
2.0	-1.1	104.0	-53.0	4.61	- 54.5
2.5	-1.9	10.0	-90.9	6.20	76.6
3.0	-1.3	-95.0	-107.9	5.26	198.9
3.5	-2.3	-198.0	-73.1	4.76	268.6
4.0	-2.4	-276.0	-24.7	4.47	298.6
4.5	3.6	-306.0	6.4	3.82	305.0
5.0	4.4	-287.0	1.7	3.25	277.6
5.5	7.2	-248.0	5.0	4.24	231.6
6.0	10.0	-198.0	7.1	4.69	176.2
6.5	10.8	-177.0	8.0	5.88	152.3
7.0	9.6	-171.0	9.3	10.50	141.6

Table IX
J-11 (26 June-7 July)

Depth (m)	$\partial S/\partial t$ $(gm^{-3}s^{-1})\times10^4$	$\bar{U}_1\,\partial \bar{S}/\partial x_1$ $(gm^{-3}s^{-1})\times10^4$	$\bar{U}_2\,\partial \bar{S}/\partial x_2$ $(gm^{-3}s^{-1})\times10^4$	$\frac{1}{w}\frac{\partial w\langle u_1' s'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1})\times10^4$	$\frac{1}{w}\frac{\partial w\langle u_2' s'\rangle}{\partial x_2}$ $(gm^{-3}s^{-1})\times10^4$
0.0	-1.2	488.0	0.0	-8.42	-478.4
0.5	-1.1	416.0	-10.5	-8.42	-396.0
1.0	-1.2	334.0	-15.1	-8.42	-309.3
1.5	-0.5	244.0	- 8.1	-8.42	-227.0
2.0	-1.0	133.0	-12.9	-6.52	-112.6
2.5	-1.3	19.0	-25.9	-5.89	14.1
3.0	-1.0	-128.0	-47.8	-5.23	182.0
3.5	-0.1	-181.0	-34.4	-5.24	220.7
4.0	-0.8	-215.0	-9.9	-4.89	230.6
4.5	1.3	-236.0	1.3	-4.90	238.3
5.0	1.3	-256.0	5.5	-4.98	254.2
5.5	1.4	-272.0	10.6	-4.98	265.0
6.0	2.6	-284.0	10.8	-5.05	276.1
6.5	3.1	-294.0	13.1	-5.09	282.9
7.0	2.4	-299.0	23.5	-5.13	278.2

Table IX
J-11 (17-21 July)

Depth (m)	$\partial \bar{s}/\partial t$ $(gm^{-3}s^{-1}) \times 10^4$	$\bar{U}_1\, \partial \bar{s}/\partial x_1$ $(gm^{-3}s^{-1}) \times 10^4$	$\bar{U}_2\, \partial \bar{s}/\partial x_2$ $(gm^{-3}s^{-1}) \times 10^4$	$\frac{1}{\omega} \frac{\partial \omega \langle u_1' s' \rangle}{\partial x_1}$ $(gm^{-3}s^{-1}) \times 10^4$	$\frac{1}{\omega} \frac{\partial \omega \langle u_2' s' \rangle}{\partial x_2}$ $(gm^{-3}s^{-1}) \times 10^4$
0.0	0.2	617.0	0.0	-0.51	-616.7
0.5	0.0	501.0	-6.4	-0.51	-494.1
1.0	0.0	370.0	-9.5	-0.51	-360.0
1.5	-2.2	230.0	-14.7	-0.34	-212.8
2.0	-0.1	115.0	-41.4	0.98	-74.5
2.5	-0.2	19.0	-85.5	1.75	65.0
3.0	0.0	-88.0	-126.1	1.75	212.3
3.5	0.7	-203.0	-90.2	1.58	290.9
4.0	0.4	-271.0	-30.7	1.91	299.4
4.5	-2.9	-328.0	-10.6	2.17	339.3
5.0	-3.6	-314.0	-1.8	1.83	317.6
5.5	-5.5	-287.0	2.7	2.12	287.7
6.0	-6.7	-274.0	4.7	2.01	274.0
6.5	-6.5	-274.0	12.0	3.02	265.5
7.0	-4.9	-274.0	24.1	5.13	249.7

Table IX
J-17 (18-23 June)

Depth (m)	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times10^4$	$\bar{U}_1\,\partial\bar{S}/\partial x_1$ $(gm^{-3}s^{-1})\times10^4$	$\bar{U}_2\,\partial\bar{S}/\partial x_2$ $(gm^{-3}s^{-1})\times10^4$	$\frac{1}{\omega}\frac{\partial\omega\langle u_1's'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1})\times10^4$	$\frac{1}{\omega}\frac{\partial\omega\langle u_2's'\rangle}{\partial x_2}$ $(gm^{-3}s^{-1})\times10^4$
0.0	-4.2	484.0	0.0	1.29	-481.1
0.5	-3.6	407.0	-1.0	1.29	-403.7
1.0	-1.3	326.0	-1.4	1.29	-324.6
1.5	0.0	238.0	-1.9	0.61	-236.7
2.0	-0.1	159.0	-4.2	0.17	-154.9
2.5	0.1	88.0	-21.9	-1.00	- 65.2
3.0	0.8	-8.0	-117.0	-0.76	125.0
3.5	2.5	-118.0	-154.8	-0.64	270.9
4.0	4.8	-219.0	-81.0	-0.58	295.8
4.5	15.5	-279.0	-33.8	-0.62	297.9
5.0	14.5	-288.0	-13.7	-0.44	287.6
5.5	10.0	-278.0	-9.2	-0.68	277.9
6.0	10.5	-278.0	-6.7	-1.17	275.4
6.5	11.9	-286.0	-5.2	-0.60	279.9
7.0	12.0	-318.0	3.5	-1.03	303.5
7.5	12.0	-345.0	1.3	-0.09	332.6

Table IX
J-17 (26 June-7 July)

Depth (m)	$\partial\bar{s}/\partial t$ $(gm^{-3}s^{-1})\times 10^4$	$\bar{u}_1\, \partial\bar{s}/\partial x_1$ $(gm^{-3}s^{-1})\times 10^4$	$\bar{u}_2\, \partial\bar{s}/\partial x_2$ $(gm^{-3}s^{-1})\times 10^4$	$\frac{1}{\omega}\frac{\partial\omega\langle u_1's'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1})\times 10^4$	$\frac{1}{\omega}\frac{\partial\omega\langle u_2's'\rangle}{\partial x_2}$ $(gm^{-3}s^{-1})\times 10^4$
0.0	-1.8	503.0	0.0	-0.60	-500.6
0.5	-1.2	426.0	-1.0	-0.60	-423.2
1.0	-1.1	360.0	-1.4	-0.60	-356.9
1.5	0.0	268.0	-3.1	-0.60	-264.3
2.0	0.0	188.0	-20.9	-0.39	-[illegible]6.7
2.5	1.0	90.0	-48.6	-0.61	- 1.8
3.0	4.0	-17.0	-64.4	-0.54	81.5
3.5	4.0	-106.0	-99.0	-0.87	201.9
4.0	4.0	-175.0	-83.6	-1.14	255.7
4.5	5.3	-226.0	-31.2	-1.28	253.2
5.0	4.9	-317.0	-8.1	-1.44	321.6
5.5	3.8	-395.0	-10.6	-1.49	403.3
6.0	3.7	-445.0	-11.2	-1.53	454.0
6.5	3.7	-453.0	-2.3	-1.63	453.2
7.0	3.7	-430.0	6.7	-0.34	419.9
7.5	3.7	-392.0	16.3	-0.08	372.1

Table IX
J-17 (17-21 July)

Depth (m)	$\partial S/\partial t$ $(gm^{-3}s^{-1})\times10^4$	$\bar{U}_1\, \partial S/\partial x_1$ $(gm^{-3}s^{-1})\times10^4$	$\bar{U}_2\, \partial S/\partial x_2$ $(gm^{-3}s^{-1})\times10^4$	$\frac{1}{\omega}\frac{\partial \omega\langle u_1's'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1})\times10^4$	$\frac{1}{\omega}\frac{\partial \omega\langle u_2's'\rangle}{\partial x_2}$ $(gm^{-3}s^{-1})\times10^4$
0.0	-0.2	555.0	0.0	5.05	-559.8
0.5	-0.5	473.0	-1.0	5.05	-476.6
1.0	-1.6	370.0	-1.5	5.05	-372.1
1.5	-1.9	254.0	-2.1	1.96	-252.0
2.0	-1.1	161.0	-11.0	1.55	-150.5
2.5	-1.2	92.0	-28.9	0.86	- 62.8
3.0	-1.9	4.0	-114.1	0.0	116.0
3.5	-3.5	-114.0	-164.3	0.0	281.8
4.0	-4.9	-183.0	-93.1	0.25	281.3
4.5	-11.3	-229.0	-39.1	-0.31	279.7
5.0	-10.9	-288.0	-10.9	-0.63	310.4
5.5	-9.6	-331.0	-5.5	-0.84	346.9
6.0	-8.7	-367.0	-4.8	-0.93	381.4
6.5	-8.9	-386.0	2.3	-1.20	393.8
7.0	-9.4	-390.0	14.0	-0.38	335.8
7.5	-9.5	-390.0	34.8	-0.48	355.2

Table IX
J-24 (18-23 June)

Depth (m)	$\partial\bar{S}/\partial t$ $(gm^{-3}s^{-1})\times 10^4$	$\bar{U}_1\,\partial\bar{S}/\partial x_1$ $(gm^{-3}s^{-1})\times 10^4$	$\bar{U}_2\,\partial\bar{S}/\partial x_2$ $(gm^{-3}s^{-1})\times 10^4$	$\frac{1}{\omega}\frac{\partial\omega\langle u_1' s'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1})\times 10^4$	$\frac{1}{\omega}\frac{\partial\omega\langle u_2' s'\rangle}{\partial x_2}$ $(gm^{-3}s^{-1})\times 10^4$
0.0	-0.71	1010.0	0.00	0.16	-1009.5
0.5	0.05	551.0	1.8	0.16	- 553.0
1.0	0.09	193.0	1.1	0.16	- 194.4
1.5	0.0	9.0	0.7	-4.87	- 4.8
2.0	0.0	-113.0	-1.7	-11.74	126.4
2.5	-0.42	-209.0	-18.7	-13.46	241.6
3.0	0.0	-293.0	-93.8	-15.76	402.6
3.5	-0.99	-379.0	-197.8	-15.08	592.9
4.0	-0.52	-419.0	-152.0	-14.78	586.3
4.5	1.30	-454.0	-61.8	-14.17	528.7
5.0	1.60	-465.0	-33.3	-15.78	512.5
5.5	2.60	-470.0	-26.5	-22.68	516.6
6.0	2.60	-478.0	-32.6	-30.55	538.6
6.5	2.60	-483.0	-26.5	-38.23	545.1
7.0	2.90	-486.0	-12.9	-33.26	529.3

Table IX
J-24 (26 June-7 July)

Depth (m)	$\partial \bar{s}/\partial t$ $(gm^{-3}s^{-1}) \times 10^4$	$\bar{U}_1 \, \partial \bar{s}/\partial x_1$ $(gm^{-3}s^{-1}) \times 10^4$	$\bar{U}_2 \, \partial \bar{s}/\partial x_2$ $(gm^{-3}s^{-1}) \times 10^4$	$\frac{1}{\omega} \frac{\partial \omega \langle u_1' s' \rangle}{\partial x_1}$ $(gm^{-3}s^{-1}) \times 10^4$	$\frac{1}{\omega} \frac{\partial \omega \langle u_2' s' \rangle}{\partial x_2}$ $(gm^{-3}s^{-1}) \times 10^4$
0.0	-0.71	1032.0	0.0	15.74	-1047.0
0.5	-0.80	656.0	1.1	15.74	-672.0
1.0	-0.94	266.0	0.7	15.74	-281.5
1.5	-0.75	5.0	0.2	13.50	-18.0
2.0	-1.30	-167.0	-1.0	11.84	167.5
2.5	-1.20	-271.0	-15.0	15.43	271.8
3.0	-1.60	-312.0	-86.0	11.67	387.9
3.5	-1.10	-331.0	-205.2	10.17	527.1
4.0	-1.60	-349.0	-183.7	10.71	523.6
4.5	-0.09	-368.0	-78.5	11.67	434.9
5.0	0.14	-442.0	-42.7	11.44	473.1
5.5	1.10	-589.0	-34.9	8.90	613.9
6.0	1.10	-685.0	-42.4	5.74	720.6
6.5	1.10	-690.0	-27.7	3.20	713.4
7.0	1.10	-690.0	-11.0	1.00	698.9

Table IX
J-24 (17-21 July)

Depth (m)	$\partial \bar{S}/\partial t$ $(gm^{-3}s^{-1})\times 10^4$	$\bar{U}_1\, \partial \bar{S}/\partial x_1$ $(gm^{-3}s^{-1})\times 10^4$	$\bar{U}_2\, \partial \bar{S}/\partial x_2$ $(gm^{-3}s^{-1})\times 10^4$	$\frac{1}{w}\frac{\partial w\langle u_1' s'\rangle}{\partial x_1}$ $(gm^{-3}s^{-1})\times 10^4$	$\frac{1}{w}\frac{\partial w\langle u_2' s'\rangle}{\partial x_2}$ $(gm^{-3}s^{-1})\times 10^4$
0.0	-0.71	1034.0	0.0	3.86	-1037.2
0.5	-1.20	638.0	3.8	3.86	-644.5
1.0	-1.50	253.0	1.5	3.86	-256.9
1.5	-1.70	5.0	1.9	1.64	-6.8
2.0	-1.10	-153.0	1.2	-1.52	154.4
2.5	-1.10	-257.0	-2.5	-3.46	264.1
3.0	-0.61	-338.0	-35.9	-3.40	377.9
3.5	-1.60	-400.0	-125.4	-3.65	530.6
4.0	-0.75	-459.0	-128.1	-3.93	591.7
4.5	-0.56	-502.0	-65.4	-4.62	572.6
5.0	-0.80	-544.0	-31.2	-2.60	578.6
5.5	-0.94	-558.0	-32.8	-7.32	599.0
6.0	-1.20	-569.0	-38.6	-11.53	620.3
6.5	-1.20	-569.0	-22.1	-12.90	605.2
7.0	-1.20	-569.0	-6.9	-15.22	592.3

Table X
J-11 (18-23 June)

Depth (m)	ω (m) $\times 10^{-3}$	A* $(gm^{-3}s^{-1}) \times 10^{4}$	$\sum \omega A \Delta x_2$ $(gm^{-1}s^{-1}) \times 10$	$\langle v_2' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^{4}$
0.0	4.30	538.4	-324.6	37.7
0.5	4.30	403.9	1717.4	-199.7
1.0	4.30	283.2	3209.4	-373.2
1.5	4.30	161.5	4159.4	-483.7
2.0	3.71	54.5	4632.4	-624.3
2.5	3.21	-76.6	4934.4	-768.6
3.0	3.06	-198.9	4498.4	-735.0
3.5	2.88	-268.6	3795.4	-658.9
4.0	2.64	-298.6	3014.3	-570.9
4.5	2.49	-305.0	2239.1	-449.6
5.0	2.35	-277.6	1525.7	-324.6
5.5	2.19	-231.6	924.3	-215.1
6.0	1.98	-176.2	515.9	-130.3
6.5	1.69	-152.3	217.6	-64.4
7.0	1.19	-141.6	0.0	0.0

$$* \quad A = \left(\frac{\partial \bar{s}}{\partial t} + \bar{v}_1 \frac{\partial \bar{s}}{\partial x_1} + \bar{v}_2 \frac{\partial \bar{s}}{\partial x_2} + \frac{1}{\omega} \frac{\partial \omega \langle v_1' s' \rangle}{\partial x_1} \right)$$

Table X
J-11 (26 June-7 July)

Depth (m)	ω (m) $\times 10^{-3}$	A $(g\,m^{-3}s^{-1}) \times 10^{4}$	$\sum \omega A \Delta x_2$ $(g\,m^{-1}s^{-1}) \times 10$	$\langle v_2' s' \rangle$ $(g\,m^{-2}s^{-1}) \times 10^{4}$
0.0	4.16	478.4	-915.0	109.8
0.5	4.16	396.0	964.0	-115.9
1.0	4.16	309.3	2473.0	-297.2
1.5	4.16	227.0	3047.0	-429.5
2.0	3.71	112.6	4412.0	-594.6
2.5	3.21	-14.1	4903.0	-763.7
3.0	3.06	-182.0	4523.0	-739.1
3.5	2.88	-220.7	3903.0	-677.6
4.0	2.64	-230.6	3277.0	-620.6
4.5	2.49	-238.3	2680.0	-538.2
5.0	2.35	-254.2	2104.0	-447.7
5.5	2.19	-265.0	1509.0	-344.5
6.0	1.98	-276.1	938.0	-236.9
6.5	1.69	-282.9	420.0	-124.3
7.0	1.19	-278.2	0.0	0.0

Table X
J-11(17-21 July)

Depth (m)	ω (m) $\times 10^{-3}$	A $(gm^{-3}s^{-1}) \times 10^{4}$	$\Sigma \omega A \Delta x_2$ $(gm^{-1}s^{-1}) \times 10$	$\langle v_2' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^{4}$
0.0	4.43	616.7	-685.0	77.4
0.5	4.43	494.1	1736.0	-196.1
1.0	4.43	360.0	3576.0	-407.2
1.5	4.43	212.8	4776.0	-539.0
2.0	3.71	74.5	5421.0	-730.6
2.5	3.21	-65.0	5806.0	-904.4
3.0	3.06	-212.3	5363.0	-876.3
3.5	2.88	-290.9	4588.0	-796.5
4.0	2.64	-299.4	3760.0	-712.1
4.5	2.49	-339.3	2959.0	-594.1
5.0	2.35	-317.6	2156.0	-485.7
5.5	2.19	-287.7	1466.0	-334.7
6.0	1.98	-274.0	879.0	-222.0
6.5	1.69	-265.5	383.0	-113.3
7.0	1.19	-249.7	0.0	0.0

Table X
J-17(18-23 June)

Depth (m)	ω (m)$\times 10^{-3}$	A $(g\,m^{-3}s^{-1})\times 10^{4}$	$\sum \omega A \Delta x_2$ $(g\,m^{-1}s^{-1})\times 10$	$\langle v_2' s' \rangle$ $(g\,m^{-2}s^{-1})\times 10^{4}$
0.0	3.03	481.1	11.0	-1.8
0.5	3.03	403.7	1353.0	-223.3
1.0	3.03	324.6	2483.0	-409.7
1.5	3.03	236.7	3341.0	-551.3
2.0	3.02	154.9	3932.0	-651.0
2.5	2.69	65.2	4278.0	-795.2
3.0	2.34	-125.0	4271.0	-912.6
3.5	2.17	-270.9	3792.0	-873.7
4.0	2.02	-295.8	3191.0	-789.9
4.5	1.80	-297.9	2616.0	-726.7
5.0	1.63	-287.6	2112.0	-647.9
5.5	1.57	-277.9	1657.0	-527.7
6.0	1.53	-275.4	1220.0	-398.7
6.5	1.44	-279.9	807.0	-280.2
7.0	1.34	-312.8	402.0	-150.0
7.5	1.06	-345.9	0.0	0.0

Table X
J-17 (26 June-7 July)

Depth (m)	ω (m) $\times 10^{-3}$	A $(gm^{-3}s^{-1}) \times 10^{4}$	$\sum \omega A \Delta x_2$ $(g\,m^{-1}s^{-1}) \times 10$	$\langle v_2' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^{4}$
0.0	3.31	500.6	355.0	-53.6
0.5	3.31	423.2	1755.0	-265.1
1.0	3.31	356.9	2937.0	-443.5
1.5	3.31	264.3	3873.0	-585.0
2.0	3.02	166.7	4512.0	-747.0
2.5	2.69	41.8	4834.0	-898.5
3.0	2.34	-81.5	4794.0	-1024.4
3.5	2.17	-201.9	4474.0	-1030.9
4.0	2.02	-255.7	3991.0	-987.9
4.5	1.80	-253.2	3506.0	-973.9
5.0	1.63	-321.6	3025.0	-927.9
5.5	1.57	-403.3	2449.0	-779.9
6.0	1.53	-454.0	1784.0	-583.0
6.5	1.44	-453.2	1107.0	-384.4
7.0	1.34	-419.9	493.0	-183.9
7.5	1.06	-372.1	0.0	0.0

Table X
J-17 (17-21 July)

Depth (m)	ω (m)$\times 10^{-3}$	A $(gm^{-3}s^{-1})\times 10^{4}$	$\Sigma\, \omega A\, \Delta x_2$ $(gm^{-1}s^{-1})\times 10$	$\langle v_2' s' \rangle$ $(gm^{-2}s^{-1})\times 10^{4}$
0.0	3.06	559.8	60.0	-9.8
0.5	3.06	476.6	1639.0	-268.0
1.0	3.06	372.1	2943.0	-480.6
1.5	3.06	252.0	3914.0	-639.6
2.0	3.02	150.5	4510.0	-746.7
2.5	2.69	62.8	4843.0	-900.2
3.0	2.34	-116.0	4779.0	-1021.1
3.5	2.17	-281.8	4314.0	-994.0
4.0	2.02	-281.3	3714.0	-919.3
4.5	1.80	-279.7	3181.0	-883.6
5.0	1.63	-310.4	2683.0	-823.0
5.5	1.57	-346.9	2161.0	-688.2
6.0	1.53	-381.4	1594.0	-520.9
6.5	1.44	-393.8	1013.0	-351.7
7.0	1.34	-385.8	467.0	-174.3
7.5	1.06	-365.2	0.0	0.0

Table X
J-24 (18-23 June)

Depth (m)	ω (m) $\times 10^{-3}$	A $(gm^{-3}s^{-1}) \times 10^{4}$	$\Sigma \omega A \Delta x_2$ $(gm^{-1}s^{-1}) \times 10$	$\langle v_2' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^{4}$
0.0	3.47	1009.5	480.0	-69.2
0.5	3.47	553.0	3080.0	-443.8
1.0	3.47	194.4	4284.0	-617.3
1.5	2.71	4.8	4624.0	-853.1
2.0	2.12	-126.4	4489.0	-1058.7
2.5	1.62	-241.6	4163.0	-1284.9
3.0	1.32	-402.6	3701.0	-1401.9
3.5	1.20	-592.9	3064.0	-1276.7
4.0	1.13	-586.3	2364.0	-1046.0
4.5	0.96	-528.7	1784.0	-929.2
5.0	0.90	-512.5	1302.0	-723.3
5.5	0.71	-516.6	870.0	-612.7
6.0	0.55	-538.6	549.0	-499.1
6.5	0.51	-545.1	260.0	-254.9
7.0	0.46	-529.3	0.0	0.0

Table X
J-24 (26 June-7 July)

Depth (m)	ω (m) $\times 10^{-3}$	A $(gm^{-3}s^{-1}) \times 10^{4}$	$\sum \omega A \Delta x_2$ $(gm^{-1}s^{-1}) \times 10$	$\langle v_2' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^{4}$
0.0	3.11	1047.0	377.0	60.6
0.5	3.11	672.0	2652.0	-426.6
1.0	3.11	281.5	4286.0	-689.1
1.5	2.71	18.0	4755.0	-877.3
2.0	2.12	-167.5	4559.0	-1075.2
2.5	1.62	-271.8	4147.0	-1279.9
3.0	1.32	-387.9	3679.0	-1393.6
3.5	1.70	-527.1	3114.0	-1297.5
4.0	1.13	-523.6	2494.0	-1103.5
4.5	0.96	-434.9	1996.0	-1039.6
5.0	0.90	-473.1	1589.0	-882.8
5.5	0.71	-613.9	1136.0	-800.0
6.0	0.55	-720.6	722.0	-656.4
6.5	0.51	-713.4	339.0	-332.3
7.0	0.45	-698.9	0.0	0.0

Table X
J-24 (17-21 July)

Depth (m)	ω $(m) \times 10^{-3}$	A $(gm^{-3}s^{-1}) \times 10^4$	$\sum \omega A \Delta x_2$ $(gm^{-1}s^{-1}) \times 10$	$\langle v_2' s' \rangle$ $(gm^{-2}s^{-1}) \times 10^4$
0.0	3.59	1037.2	125.0	-17.4
0.5	3.59	644.5	2985.0	-415.7
1.0	3.59	256.9	4446.0	-619.2
1.5	2.71	6.8	4866.0	-897.8
2.0	2.12	-154.4	4684.0	-1104.7
2.5	1.62	-264.1	4301.0	-1327.5
3.0	1.32	-377.9	3842.0	-1455.3
3.5	1.20	-530.6	3282.0	-1367.5
4.0	1.13	-591.7	2613.0	-1156.2
4.5	0.96	-572.6	2007.0	-1045.3
5.0	0.90	-578.6	1476.0	-820.0
5.5	0.71	-599.0	987.0	-695.1
6.0	0.55	-620.3	615.0	-559.1
6.5	0.51	-605.2	288.0	-282.4
7.0	0.46	-592.3	-0.0	-0.0

Table XI

PERIOD	J-11			J-17			J-24		
	$\langle\overline{v_2' s'}\rangle$ $(gm^{-2}s^{-1})\times10^{4}$	$\overline{\omega}$ $(m)\times10^{-3}$	$\overline{\omega}\langle\overline{v_2' s'}\rangle$ $(gm^{-1}s^{-1})\times10$	$\langle\overline{v_2' s'}\rangle$ $(gm^{-2}s^{-1})\times10^{4}$	$\overline{\omega}$ $(m)\times10^{-3}$	$\overline{\omega}\langle\overline{v_2' s'}\rangle$ $(gm^{-1}s^{-1})\times10$	$\langle\overline{v_2' s'}\rangle$ $(gm^{-2}s^{-1})\times10^{4}$	$\overline{\omega}$ $(m)\times10^{3}$	$\overline{\omega}\langle\overline{v_2' s'}\rangle$ $(gm^{-1}s^{-1})\times10$
18-23 June	418	3.10	1298	529	2.24	1186	786	1.72	1352
26 June-7 July	415	3.10	1287	666	2.24	1492	847	1.72	1457
17-21 July	487	3.10	1510	642	2.24	1439	839	1.72	1443

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